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[Historic and Scientific Objects of Interest.pdf](#)  
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Matt,

While looking for something else, I found these two documents buried in this folder

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I put copies in Z:\Planning\GSENM Proclamation.Objects&Values\Object lists

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## List of Historic and Scientific Objects of Interest

DESCRIPTION	LOCATION	SOURCE
<b>Objects of Geologic Interest</b>		
Perennial streams enter entrenched canyons in white Navajo and deep-red Wingate Sandstone. Deer Creek, Steep Creek, and The Gulch have perennial flows of clear cold water. The Gulch leads up into the spectacular Circle Cliffs where remarkable specimens of petrified wood (60 ft. logs) exist in the Morrison and Chinle formations.	Escalante - Steep Creek WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
White Canyon cuts through the Kaibab Limestone to the Coconino Sandstone, the oldest stratum in the Upper Escalante drainage.	Escalante - Studhorse Peaks unit	Davidson, E.S., <i>Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967.</i> p. 10
Big Spencer Flat Road and the V Road is site of "thunderball" iron concretions known as Moqui marbles. These oddities weather out of the Navajo sandstone and are a popular recreation feature.	North Escalante Canyons WSA	Sargent, K.A., <i>Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.</i> p. 16, and <i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The Waterpocket Fold tops out at Deer Point (7,243 feet). Most of the Waterpocket Fold is in the Capitol Reef National Park where it is a major landmark.	Escalante - Colt Mesa unit	Utah Wilderness Coalition. <i>Wilderness at the Edge.</i> p. 189, and Davidson, E.S., <i>Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967.</i> p. 61
The inner gorges of the upper Moody Canyons cut into the relatively harder Kaibab Limestone and Coconino Sandstone (oldest exposed layer in this region).	Escalante - Colt Mesa unit	Utah Wilderness Coalition. <i>Wilderness at the Edge.</i> p. 189
Dry Valley Creek Canyon. A waterfall blocks the entrance to Dry Valley Creek Canyon and consequently, the canyon remains in its natural condition. A perennial stream cuts through alluvial benches. It is relict and probably possesses important scientific values.	Mud Springs Canyon WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>

The East Kaibab Monocline or the Cockscomb is unique as a Colorado Plateau structure. Its alignment with the Paunsaugant, Sevier, and Hurricane faults suggest that it too could be a fault at depth. It extends from the Colorado River north to Canaan Peak and is a major landmark.	Kaiparowits Plateau - The Cockscomb WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The Blues - a Cretaceous shale badlands, richly colored and contrasting with adjacent pink sandstone cliffs that forms a significant part of the vista for visitors to Bryce Canyon National Park. The Kaiparowits formation is well exposed here represents an accumulation of exceedingly rapid proportions and an immature sedimentary region which is not well displayed in any other formation in the Colorado Plateau.	The Blues WSA (near Bryce Canyon)	Welch, S.L., Rigby, J.K., Hamblin, W.K., <i>A Survey of Natural Landmark Areas of the North Portion of the Colorado Plateau</i> , 1980 p. 248
Fiftymile Mountain is a complex of deep canyons, upwarps, monoclines, hogbacks and a spectacular 42-mile long Straight Cliffs wall, topping a thousand-foot-high cliffline of the Summerville, Morrison and Dakota formations. This complex marks the edge of the Kaiparowits Plateau.	Kaiparowits Plateau - Fiftymile Mountain WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Ancient coal fires of Right Hand Collet Canyon have left surface remains in the form of clinkers and deep red ash. These remains dominate the visual character of the drainage.	Carcass Canyon WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Arch. Span of 40 feet located in Calf Canyon, and is visible from the Alvey Wash road.	Carcass Canyon WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Burning Hills - naturally occurring underground coal fires have turned steep and rugged exposed hilltops a distinctive red.	Burning Hills WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Devils Garden - oddly shaped arches (including Metate Arch) and rock formations in the hills at the foot of the cliffs marking the Kaiparowits Plateau.	Carcass Canyon WSA (east of WSA)	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
This area possesses exceptional scenic values and contains a portion of the Cockscomb, a prominent southern Utah geologic feature. the Cockscomb forms 2 parallel knife-edged ridges with a bisection V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge. These major features of south central Utah cover over 4,000 acres.	Mud Spring WSA.	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>



An interesting fold in Henrieville Creek along the northwest boundary of the WSA is of geologic interest and a sightseeing attraction.	Mud Spring WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Window Wind Arch above the middle trail has scenic value because of its location on the very edge of the Straight Cliffs. The Straight Cliffs escarpment is major landmark in south-central Utah and an important scenic feature within view from the Hole-in-the-Rock road. Woolsey Arch is located in Rock Creek Basin, an area of colorful Navajo sandstone and high cliffs.	Fifty Mile Mountain WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Unique because it consists of 2 prominent southern Utah physiographic systems. It includes the eastern most extension of the White Cliffs component of the famous ascending staircase, cliff and terrace physiography, the Vermillion, White, and Pink Cliffs; and east of the Paria river, the dividing point is the landscape representative of the Glen Canyon physiography of sculptured, dissected, and exposed Navajo sandstone. The area where these merge between Deer Range and Rock Springs Bench is a highly scenic complex and colorful landscape.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The Vermillion Cliffs with its associated Wingate Sandstone cliffs, colorful Chinle badlands, and canyons with there multiple colors and the intensity of coloration contribute to high scenic quality. Included in this landscape are Hackberry Canyon, Paria River Valley, Hogeys Canyon, the Pilot Ridge-Starlight Canyon-Kirbys Point area and Eight Mile Pass.	Paria-Hackberry WSA.	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
An area of high scenic value include the breaks of the Rush Beds and the west wall of Cottonwood Canyon, upper tributaries to Hackberry Canyon, Death Valley Draw, and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Four ONA's designated to preserve "unique scenic values and natural wonders". North Escalante Canyon (5,800 acres), The Gulch (3,430), Escalante Canyons (480 acres), Phipps-Death Hollow (12 more outside WSA)	North Escalante Canyons WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>



This area is geologically complex and has some of the most outstanding canyon scenery in the country. Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.	North Escalante Canyons/The Gulch ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
A unique feature of the Burning Hills is the red coloration in the landscape is the result of geological changes attributed to the naturally occurring coal fires. The coloration creates a highly scenic area.	Burning Hills WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The White Cliffs are high white or yellow cliffs of Navajo Sandstone. Vary in height from 600' at Deer Springs Point bench to 1,200' at Deer Springs Point and the Sheep Creek Bull Valley Gorge-Paria River confluence. The cliffs consistently reach a 1000' in height and the cliffline is interrupted by 8 canyons.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
This area contains twenty-four undeveloped springs. Ten are located in upper Paria, 6 in hackberry, 5 on the eastern border of Cottonwood Creek, and 3 on west boundary. There are also 6 developed springs. These are significant features in this arid environment.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Phipps-Death Hollow ONA (12/23/70) contains 34,288 acres managed to preserve scenic values and natural wonders.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Arches. Peek-a-boo Rock, Wahweap Window, Jacob Hamblin Arch, Starlight Arch, Cobra Arch, Sam Pollack Arch, Woolsey Arch, and several more unnamed arches and natural bridges.	Kaiparowits Plateau and adjacent areas	Sargent, K.A., <i>Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.</i>
Sand-calcite crystals from the Morrison Formation. These crystals are the first reported occurrence from rocks of Jurassic age and only reported sand crystals in southern Utah.	Kaiparowits Plateau	Sargent, K.A., <i>Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.</i> p. 18
Circle Cliffs in the northeast portion of WSA features intensively colored red, orange, and purple Chinle mounds and ledges at the base of Wingate Sandstone cliffs. Vertically jointed cliffs banded with red, yellow, and white colors and bench tops and upper cliff faces possess innumerable orange-red Kayenta Sandstone knobs. One of most spectacular and distinctive landscapes on the Colorado Plateau.	Steep Creek WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>

Area includes Escalante Natural Bridge (130' high, 100' span) and 4 other natural bridges and arches.	Phipps-Death Hollow WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The Gulch is a major geologic feature. Deeply entrenched very sheer red straight line Wingate Sandstone walls. High ridges and slickrock peaks. Ridges drop fairly abruptly to canyons below.	Steep Creek WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Lamanite Natural Bridge. Actually a large arch with good symmetry and form. Located in an impressive setting in a deep side canyon to The Gulch.	Steep Creek WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Petrified wood. Upper Gulch-Circle Cliffs contains large, unbroken logs of petrified wood (NEA 2,213 acres). Maximum log length 36'. The scenic values of these logs is enhanced by their colorful surroundings.	Steep Creek WSA	<i>Utah Statewide Wilderness EIS, 1990 W FEIS 3B 19, and Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p.13.</i>
Outstanding scenic values include the upper portion of Paradise Canyon where sandstone in the Wahweap Formation outcrops as colorful walls and cliffs. Ponderosa pine growing in the sandstone enhance the scenic values. Two sandstone monoliths or fins above Alvey Wash are prominent geological features.	Death Ridge WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The area contains a unique canyon and bench system. The entire ISA contains outstanding scenery. Examples include the area east of Horse Canyon. Four canyons have isolated 10 benches of varying size. Many bench tops have intricate pattern of innumerable orange-red Kayenta Sandstone knobs. Wolverine Canyon and Death Hollow have extremely narrow and convoluted sections. Another feature, Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.	North Escalante Canyons/The Gulch ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Mollie's Nipple, an erosional remnant is a major landmark in the area.	Kaiparowits Plateau.	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Natural Arches. Sam Pollock Arch, located at the head of a tributary drainage of Hackberry Canyon, and Starlight Arch located west of No Man's Mesa.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>

Area of diverse geology represented by spectacular deep canyons. The Escalante River canyon is 1100 feet deep. The canyon walls are rough and broken and the canyon is narrow and it meanders. Pure white to golden sandstone has been eroded into expanses of slickrock. Death Hollow Canyon is 1,000' feet deep and meandering. The extensive upper basin through which Mamie Creek flows is a extremely dissected area of canyons, tanks, other formations. Red layers of Carmel Formation cap high mesas and ledges of the exposed Kayenta Formation.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Petrified wood deposits just west of the Old Paria Townsite and in Hackberry Canyon. Both are in the Chinle formation.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
All the topographic features of the Kaiparowits region have been developed in sedimentary rocks. The Kaiparowits Plateau is a slightly tilted sedimentary mass that extends as a narrow mesa from the High Plateaus to Glen Canyon 70 miles distant. Its culminating point, Canaan Peak is an outlier of the Table Cliff Plateau; the Paria Plateau is a huge block of sandstone, the Waterpocket monocline is a ridge of folded rock intricately dissected and flanked by hogbacks, and the broken "comb" in the vicinity of Paria is the edge of sandstone beds upturned in the East Kaibab fold. The Circle Cliffs are inward-facing walls of sandstone that rim an oval depression. These prominent features are but large-scale examples of the mesas, buttes, and ridges that characterize the landscape of southern Utah.	Kaiparowits Plateau region	Gregory, H.E. and Moore, R. C. <i>The Kaiparowits Region; A Geographic and Geologic Reconnaissance of Part of Utah and Arizona.</i> 1931.
Paria River from Colorado River to its source, identified by NPS as possessing values that may be of national significance, potential to be included in the National Wild and Scenic River System.	Paria-hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Escalante River from Lake Powell to its source, a section of 14.9 miles, was designated as for study as a candidate Wild and Scenic River by the Secretary of the Interior on 10/11/70.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>



Lower Calf Creek Falls. Calf Creek Canyon is characterized by red alcoved walls, 2 waterfalls, and extensive expanses of white slickrock. Lower Calf Creek Falls drops 126' and Upper Calf Creek's drop is 86'. High educational values associated with interpretation of these areas.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The area contains 40 miles of perennial streams, a significant feature in this arid environment.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
<b>Objects of Paleontologic Interest</b>		
Fossil assemblage photographs. Typical mollusks from Tropic Shale, south of Escalante include straight cone cephalopods, ammonites, gastropods, and pelecypods and Cretaceous sharks teeth from the Straight Cliffs Formation.	Kaiparowits Plateau	Sargent, K.A., <i>Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah</i> . pp 14-15
Gray Cliffs/Pink Cliffs - This sequence of rocks may contain one of the best and most continuous records of Late Cretaceous terrestrial life in the world. Formation has yielded early mammals, lizards, dinosaurs, crocodillians, turtles, mollusks.	Kaiparowits - The Blues WSA	BLM, <i>Escalante/Kanab RMP - Grand Staircase Ecosystem Analysis, 1994</i>
Fossils deemed by the Museum of Northern Arizona in a 1976 study to be of major importance. They are found in the Cretaceous Wahweap Formation outcrops include abundant fragments of turtle shells and dinosaurs, as well as several crocodile teeth. There is an excellent chance that mammal fossils will be found	Kaiparowits Plateau - Nipple Bench unit	BLM, <i>Kaiparowits power project environmental impact statement, 1976</i>
The Straight Cliffs Formation is limited to the southern Utah area. It contains primitive mammals including one of the potentially oldest marsupial fossils identified.	Kaiparowits Plateau	BLM, <i>Warm Springs Project Preliminary Draft EIS, 1996</i>
Invertebrate and vertebrate specimens found Straight Cliffs, Tropic Shale, and Dakota Formations. 13 collection sites recorded (gastropods, cephalopods in upper Cretaceous Formations, vertebrate in Dakota and Tropic Shales). Likely to occur along entire length of the Straight Cliffs	Carcass Canyon WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>

The Kaiparowits is of interest in understanding the evolution of mammals and other terrestrial vertebrates. Very little is known of Cretaceous mammals prior to the latest part of that period. The mid-Cretaceous mammalian twilight zone is spanned by the fossiliferous, terrestrial rock units of the Kaiparowits region. They contain unique evidence bearing on the early diversification of important mammalian groups of the Late Cretaceous. The thickness, continuity, and broad temporal distribution of the Kaiparowits sequence provides the opportunity to document changes in terrestrial vertebrate assemblages over a wide span of Late Cretaceous time.	Kaiparowits Plateau	Eaton, Jeffrey G, and Cifelli, Richard L. <i>Preliminary report on Late Cretaceous mammals of the Kaiparowits Plateau, southern Utah</i> , 1988
Extremely significant fossils including marine and brackish water mollusks, turtles, crocodillians, lizards, dinosaurs, fishes, and mammals have been recovered from the Dakota formation, Tropic shale, Straight Cliffs Formation (Tibbet Canyon, Smoky Hollow, and John Henry members), and Wahweap formation in the area around the proposed Andalex mine and some localities lie directly along the proposed haul routes. This sequence of rocks(including the overlying Wahweap and Kaiparowits formations) contain perhaps the best and most continuous record of Late Cretaceous terrestrial life in the world	Kaiparowits Plateau	Eaton, Jeffrey G., Personal correspondence to Mr. Mike Noel, BLM, 1991
<b>Objects of Prehistoric Interest 1996</b>		
Sixty sites have been recorded and the potential for additional sites is exceptionally high. Sites discovered to date include lithic scatters, 13 rockshelters (some w/storage cysts and rock art), 1 pithouse village site and 1 structure (probably of Anasazi origin). Some of the rock art and rock shelter and 1 campsite are potentially eligible for nomination to the NRHP.	North Escalante Canyons/The Gulch ISA	<i>Utah BLM Statewide Final Wilderness EIS</i> , 1990
Friendship Cove Pictograph site nominated to NRHP. This site consists of a set of large Fremont style pictographs painted on the face of a large sandstone cliff.	Phipps-Death Hollow ISA, eastern part	<i>Utah BLM Statewide Final Wilderness EIS</i> , 1990

Forty-four sites of diverse types have been recorded in the area. 14 rock art (petroglyph and pictographs sites (2 from Fremont culture), 1 Pit-house village site, lithic scatters of Paiute and Anasazi, and 6 rockshelters have been discovered. Potential for more sites is good.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Situated at the intersection of three major prehistoric cultures the Plateau has long been a magnet for archeological study. It has been recognized that the Kaiparowits Plateau might contain important clues that would aid in answering questions in the archeology of the Southwest.	Kaiparowits Plateau	Utah Wilderness Coalition. <i>Wilderness at the Edge</i> . p. 147 and Lister, Florence C., <i>Kaiparowits Plateau and Glen Canyon prehistory, an interpretation based on ceramics</i> , 1964
Fiftymile Mountain Archeological District contains more than 400 sites including Anasazi habitations and granaries. Important scientific value. Some of the most significant cultural resources in the Four Corners area. Archaeological District (47,325 acre) has been nominated to NRHP. Majority of sites are masonry structures (of 1-10 rooms). Most are of Virgin Anasazi origin but include sites attributed to Fremont, Hopi, and Paiute. Navajo are also expected of occupying the area. 4,000 total sites may be located in WSA.	Fiftymile Mountain WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Sixty-five sites have been recorded. They include lithic and ceramic scatters, masonry structures (granaries and storage cysts), one rock shelter. Masonry and some lithic/ceramic associated with Virgin Anasazi/Virgin-Kayenta Anasazi. Two are Pueblo II-III time period. Some sites are associated with Paiute-age or Archaic-age peoples. At least 8 sites in this area are eligible for nomination to the NRHP.	Wahweap WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
High concentration of prehistoric sites. Although surveys are incomplete for the Warm Creek unit more that 600 sites have been found ranging from lithic scatters and campsites to rockshelters.	Kaiparowits Plateau/Warm Creek unit	BLM, <i>Kaiparowits power project environmental impact statement</i> , 1976
Part of a larger area extensively used by the Kayenta Anasazi and later the Southern Paiute Indians. Site densities expected to be moderate to high.	Kaiparowits Plateau/Squaw Canyon unit	ERT, 1980, <i>Kaiparowits coal development and transportation study, final report</i>



Prehistoric site densities are high on top of Nipple Bench. Sites represent Fremont, Virgin Anasazi and Kayenta Anasazi. The sites represent complex associations of features and artifacts and indicate permanent or extensive camps in rock shelters.	Kaiparowits Plateau/Nipple Bench unit	Fish, Paul, Preliminary Report Kaiparowits Power Project
Six sites have been recorded. One is Pueblo II Anasazi occupation site, with others unidentified.	Burning Hills WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
One hundred-five sites (primarily lithic scatters) have been recorded covering a broad period of occupation. Ten rockshelters w/storage cysts or storage caches, 1 w/masonry room, 3 w/granaries associated with Anasazi or Fremont have been discovered. Additional sites include petroglyph and pictograph panels associated with shelter sites and 1 burial site.	Carcass Canyon WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
One hundred thirty-four documented sites represent virtually all known prehistoric cultures in southern UT (Archaic, Fremont, Anasazi, Southern Paiute). 8,000 years of prehistory are represented. The sites primarily represent temporary habitation by hunter gatherers..	Death Ridge WSA	<i>BLM Utah Statewide Wilderness EIS, 1990, and Hauck, F.R., Cultural Resource Evaluation of South-Central Utah, 1977-1978</i>
The area contains 41 recorded sites and based on surveys may contain exceptionally high densities of sites.. Known sites include rockshelters, pit houses, lithic scatters, and masonry structures. Pictograph panels are in Deer Creek Canyon and petroglyphs are found in Snake Creek Canyon. A study located and estimated 612 sites per 23,000 acres, 564 potentially eligible for nomination to the NRHP (southern border of WSA). Another inventory estimated 360 sites per 23,000 acres at the northern border of the WSA.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>

The Kayenta Pueblo culture inhabiting the Straight Cliff and portions of the Escalante River drainage between A.D. 1000 and 1200 were likely in contact with the Fremont culture. Although both inhabited the area at the same time and competed for limited agricultural lands there is no evidence of open conflict during this time. Some modifications of pottery making techniques between the two cultures indicates that there was trade and exchange between them. Little is known positively about the Kayenta culture, and additional research in this area could provide valuable insight on interactions between the two cultures.	Straight Cliffs WSA	Lister, Kaiparowits Plateau and Glen Canyon Prehistory: An interpretation based on ceramics. 1964.
<b>Objects of Historic Interest</b>		
Dance Hall Rock/Hole-in-the-Rock Trail. While the Hole-in-the-Rock Trail was under construction in 1879, Mormon Pioneers camped at Fortymile Spring and held meetings and dances in the shelter of Dance Hall Rock. Designated historical site by DOI 1970.	Two miles west of the Glen Canyon NRA on the Hole in the Rock Trail	Utah Wilderness Coalition. <i>Wilderness at the Edge</i> . - p. 182
Historic route constructed in 1879 to provide access from Escalante to areas on the opposite side of the San Juan River in Southeast Utah.	Historic trail running from Escalante to Hole in the Rock in Glen Canyon NRA	Lambrechtse, Rudi. <i>Hiking the Escalante</i> , 1985
Boulder Mail Trail. Used to carry mail between Escalante and Boulder beginning in 1902. Much of trail still visible where necessary to construct through slickrock. Nominated to NRHP. Popular backpacking route.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS</i> , 1990
Boynton Road. Constructed 1909 as short cut between Escalante and Salt Gulch. Abandoned after 2 years because of flooding. Visible over approx 9 of its 10 miles.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS</i> , 1990
Escalante-Boulder telephone line: First Boulder-Escalante telephone line constructed by Forest Service in 1911 providing first phone service to area. Still visible between Antone Flat and Sand Creek.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS</i> , 1990
Washington Phipps grave. A historical grave site of an early pioneer shot in 1878 in a dispute with his partner John Boynton. Provided the namesake for the area.	Phipps Death Hollow	Lambrechtse, Rudi. <i>Hiking the Escalante</i> , 1985

Old Boulder Road. Main route between Escalante and Boulder until the CCC built Hell's Backbone Road and Highway 12 in 1930's to replace it.	Phipps-Death Hollow ISA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
The Hattie Green mine, an early copper working located on the crest of The Cockscomb.	The Cockscomb WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Old Paria Townsite was established in 1874 on the bench above the eastern bank of the Paria River by Mormon settlers who attempted to farm the bottomlands. Site was abandoned in 1890.	adjacent to Paria-Hackberry WSA	Abby, Edward and Hyde, Philip. <i>Slickrock</i> p.46
Old Paria Townsite movie set. Built in the 1960's to film several movies. Now abandoned but still a popular recreation destination.	adjacent to Paria-Hackberry WSA	Abby, Edward and Hyde, Philip. <i>Slickrock</i> p.46
<b>Objects of Biological Interest</b>		
Riparian zones are corridors for many of the region's species, including neotropical migrant birds. The corridors (including the Escalante, and Paria Rivers and Johnson Creek and their tributaries) bisect the region north to south, allowing for exchange of individuals among different animal populations. The importance of movement corridors to the long term viability of animal populations is of great scientific and management interest. This area would afford many opportunities to enhance this ecological issue.	Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab including the Escalante, Paria rivers and Johnson Creek	Edwards, Tom, 1996; Knopf, 1985; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.



25 miles of riparian corridor in unit. Connects mountains to desert lowlands. Has great concentration of hanging gardens and riparian vegetation, including relictual populations in canyon bottoms. Also supports many rock crevice communities. Connects other protected areas. High plant endemism, due to large extent of parent material exposure.	Escalante River	BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.
Riparian corridor links high country to lowland desert scrub. Connects protected areas. Has high concentrations of isolated communities: hanging garden, rock crevice and canyon bottom communities. Also has an abundance of packrat middens.	Paria River	Van Devender and Spaulding, 1979; BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.
Fifty miles of perennial streams including the Paria River (which is a wild and scenic river inventory segment). Riparian vegetation covers 500 acres.	Paria-Hackberry WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>

<p>Three major floras meet in this area. Plants from the Mojave, Arizona deserts and northern Utah are all found here, with a few species from the Great Plains. The Colorado Plateau is surrounded by high mountains, isolating the flora and fauna. Unlike many ecosystems, the plant density, diversity and stature within the monument is determined more by substrate than climate. Consequently, isolation, plus the great diversity of substrates (providing a wide range of soil chemistry and physical characteristics) found within close proximity to each other has resulted in a high level of plant endemism in this area. Eleven species found in the monument are found nowhere else in the world. Of plants that occur only in Utah or on the Colorado Plateau, 125 species occur in the monument. The Canyonlands portion of the Colorado Plateau, much of which is contained in the monument, is considered the richest floristic region in the Intermountain West, and contains 50% of Utah's rare and endemic plants. 90% of these rare and endemic species are found on substrates typical of most of the monument. Of the Canyonlands area, the monument area is considered one of the most significant for endemic populations, with more than 10% of the flora being found no nowhere else. Of additional significance is that many of the plants in the monument are diploid species. This means they represent the basic genetic stock from which polyploid species in the area evolved. This makes this area of great significance to plant evolutionary biologists and provides a unique opportunity to study the evolution and speciation of plant species, as well as the structure and dynamics of plant communities, independent of climate.</p>	Entire monument	<p>Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977; Utah Natural Heritage Program plant database</p>
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<p>The Colorado Plateau was uplifted and downcut without deformation. As a consequence, large areas of unmixed geologic parent materials are exposed, and plants must adapt to large array of highly distinct parent materials. These substrates are sharply demarcated, and often occur within a few meters of each other. This situation offers the unique opportunity to examine the role of soil physical and chemical characteristics in determining plant and animal community structure independent of climatic variables, an important ecological question. It also results in different plant community structure and dynamics than is generally observed in other ecosystems. This area contains shales, siltstones, mudstones, sandstones and limestone of differing depths, and deposited in a variety of environments (marine, freshwater and eolian). Each soil depth and depositional environment has very different chemical and physical characteristics. As a result, there is a great diversity of substrates in this area, each supporting a unique plant community.</p>	Entire monument	Hintze, 1988; Nabhen and Wilson, 1996; Gross, 1987; Dott, 1996; Roberts, 1987
<p>The presence of steep elevational gradients gives the opportunity to sort out the role of temperature and precipitation in structuring plant and animal communities. Elevational gradients have traditionally been used by scientists as a way of examining factors controlling biotic community structure. Juxtaposition of diverse substrates and elevational gradients gives an unparalleled opportunity to determine the respective roles of soil chemistry, physical characteristics, elevation, rainfall and temperature in structuring biotic communities. In addition, it allows for high biodiversity in a small area.</p>	Entire monument	Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977
<p>The Escalante Plateau is the home to approximately 300 species of amphibians, birds, mammals, and reptiles. This diverse set of wildlife species includes over 20 species of birds of prey including the bald eagle, peregrine falcon, and was the historical range of the condor. The region contains 2 of the 7 recognized centers of endemism for fishes of the western United States.</p>	Escalante Plateau	Davidson et al. 1996; Tom Edwards, 1996, Behnke, R.J., and Zar, M., 1976



Contains many different geologic substrates (therefore soils with different physical and chemical attributes) in a small area. The majority of endemic in Utah are found on these particular substrates; consequently, this area is expected to have a high concentration of endemics.	Escalante -along boundary of Glen Canyon NRA and Capital Reef National Park	Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988
Large expanses of fine-textured soils (Morrison, Mancos/Tropic) shales support large number of endemic plant species, fossils.	Henrieville to Escalante	Hintze, 1988; Shulz, 1993; BLM Wilderness EIS
An exposed monocline with many soils/substrates in close juxtaposition provides tremendous biodiversity of both general and endemic flora. High salt content of stream provides habitat for salt-tolerated riparian plants. Provides a elevational gradient from ponderosa pine to desert scrub. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.	The Cockscomb	Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996;
Contains a concentration of many different geologic substrates/soils with different physical and chemical attributes. This area has a high concentration of endemics. This boundary also abuts protected areas (Glen Canyon, Capitol Reef), thereby effectively increasing the value of all three areas for biological conservation. In addition, the Waterpocket Fold has isolated two outcrops of the same parent material. These two areas now support different floras. This presents an outstanding scientific opportunity to explore processes of speciation.	Far eastern boundary	Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

This is an exposed monocline. Consequently, many substrates (Summerville, Morrison, Dakota, Tropic, Entrada, Navajo, Wingate and Carmel) are exposed directly next to each other, providing an opportunity for studies of ecological processes independent of climate. This monocline also has an elevational gradient, facilitating the study of effects of temperature and moisture on community dynamics. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.	Straight Cliffs area	Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978.
Diversity of plant life ranging from low desert shrub to Ponderosa Pine (less than 1 mile apart) enhances the study and observation of ecology. 3 small stands of Ponderosa pine in Alvey Wash.	Death Ridge WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Contained within the monument are 3-5 spatially separated areas where the same substrates are exposed in close proximity to each other. In addition, there are 5 elevational gradients along riparian corridors. This is critical for replicated scientific work to be conducted.	Entire monument	Hintze, 1988; USGS Topographical Maps
Riparian corridor with elevational gradient, connecting desert low lands to the high country. Vermillion, White, Pink Cliffs (Triassic, Jurassic, Cretaceous material).	Johnson's Creek	Hintze, 1988; USGS Topographical Maps; Beier, 1993; Noss, 1992, 1993
Fifty Mile Mountain. Presence of aspen on Pleasant Grove, Steer Canyon, and Pinto Mare Canyons.	Fifty Mile Mountain WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Protects lands at low elevation sites frequently rich in species diversity. The range of elevation in these areas from approximately 4500-8300 feet encompasses a wide variation in elevation and will capture the full diversity of plant and animal species in the region.	Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab	Hintze, 1988; <i>Utah BLM Final Wilderness EIS, 1990</i>

<p>The monument contains an abundance of hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket and rock crevice communities. These small, isolated populations often contain unusual, often relictual plants and animals. Hanging gardens and canyon bottom communities harbor riparian plants and their pollinators, as well as unique vertebrates (bats and small mammals) and soil fauna. Tinajas are important aquatic resources, and contain a diverse array of tadpole, fairy and clam shrimp, amphibians, algae, water beetles, other crustaceans, snails, mosquito and gnat larvae and aquatic/riparian plants. Highly saline areas are found around many seeps and streams, and consist of plants and animals adapted to highly saline conditions. Dunal pockets contain species adapted to shifting sands, while rock crevice communities consist mostly of slow-growing species that can thrive in extremely infertile sites. These communities offer a chance to examine gene flow dynamics, and to distinguish the respective role of pollen versus seeds. They offer an opportunity to study ground water flow dynamics in the absence of significant fluvial processes, and island biogeography of plants, pollinators and ground-dwelling biota. They also are highly simplified, discrete ecosystems, making them ideal for elucidating basic ecosystem processes.</p>	Entire monument	Nabhen and Wilson, 1996; Harper et al., 1994; Welsh et al., 1993; May et al., 1995; Fowler et al., 1995; Graff, 1988
<p>These canyons provide a high concentration of isolated, unique plant and invertebrate communities: hanging garden, rock crevice, and canyon bottom communities. Many relictual plant species can be found in these communities. Pack rat middens are abundant, providing paleoclimate and paleo-vegetation information.</p>	Escalante Canyons	Axelrod, 1960; BLM Wilderness EIS; Van Devender and Spauling, 1979; Fowler et al., 1995; Nabhen and Wilson, 1996
<p>Dunal pockets contribute Great Plains species to the flora. These are unique, isolated plant communities.</p>	Cockscomb to Kaiparowits	Hintze, 1988
<p>Unique, isolated communities are located throughout the monument. These include hanging gardens, tinajas, canyon bottom, dunal pocket, salt pocket and rock crevice communities. They provide great opportunities for examining evolution, gene flow, island biogeography and other ecological principles.</p>	Entire monument	Case and Cody, 1988; Diamond, 1981; Dott, 1996; Harris, 1984; Ludwig and Whitford, 1981; Fowler et al., 1995; Nabhen and Wilson, 1996; Roberts, 1987; Reice, 1994; Axelrod, 1960



<p>Biological conservation theory and literature suggests that large contiguous conservation areas increase both extent and probability of population survival, increases protection of migratory pathways, and is the most effective means of conserving aquatic and riparian communities.</p>	<p>Entire monument</p>	<p>Soule, 1987; Davidson et al., 1996; Miller, 1961; Minckley and Deacon, 1968; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.</p>
<p>The connection with Glen Canyon provides a larger protected area. It also provides low desert vegetation as part of the vegetational gradients. Large areas are important for maintaining the evolutionary potential of plants and animals, allowing for the exchange of genetic material among the separate populations that constitute a population.</p>	<p>Common boundaries and riparian connections with Glen Canyon NRA, Capitol Reef NP, Box Hollow Wilderness and Paria Wilderness</p>	<p>Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.</p>

<p>Cryptobiotic soil crusts are critical for soil stability, nutrient availability for vascular plants and normal soil surface temperatures. These crusts are extremely fragile and easily disrupted by soil surface disturbances such as trampling or off-road vehicles. Since the soils in the monument are highly susceptible to erosion, it is important that these biocrusts be protected so they stabilize these erodible soil surfaces. In addition, these ecosystems have few nitrogen-fixing plants. Since these crusts provide nitrogen to these soils, they are a critical part of these nitrogen-limited ecosystems.</p>	Entire monument	<p>Belnap, 1994, 1995; Belnap and Harper, 1995; Belnap et al., 1994; Jefferies, 1989; Harper and Marble, 1988; Johansen, 1993; Mack and Thompson, 1978; Fleischner, 1994</p>
<p>Disturbance of most soil surfaces in the monument area will result in soil surface temperature changes, as bio-crusts are darker than the substrates underneath them. The expected lowering of temperature with disturbance would result in cooler soil temperatures, and thus later spring plant germination and lower nutrient uptake rates. This may adversely effect desert plant growth in early spring. Surface temperatures also influence foraging and burrowing patterns for many soil invertebrates, and many effect community dynamics of these species.</p>	Entire monument	<p>Ludwig and Whitford 1981; Belnap 1995</p>

<p>Ecosystems in this area are some of the most stable documented to date, as both large and small scale disturbances are limited spatially and temporally. Very little of this area was glaciated in the Pleistocene. Most plant communities evolved without fire or grazing by large ungulate herds, as evidenced by characteristics of the soils and the flora. Catastrophic events are minimal, with the exception of wash bottoms. Microsite disturbances are minimal as well, as most soils support very low populations of invertebrates. 1880 photos repeated in 1990 show many sites virtually unchanged, with the same tree, shrub and grass individuals present, indicating very low species turnover rates in this region relative to other ecosystems. In addition, dead tree branches can still be found in virtually the same condition as they were 100 years ago, indicating plant tissue decomposition rates are extremely low in this region. This makes this area highly unique, as most ecosystems are believed to be structured disturbance. In this region, ecological processes can be studied independent of the effects of disturbance to give us greater insight into their functioning (i.e. factors controlling exotic plant invasions, species-species interactions, etc.) Soil physical, chemical and biological features appear to be both easily damaged (low resistance) by surface disturbance and have very slow recovery rates (low resilience) when compared to other deserts or more mesic systems. This may be a result of evolution of this ecosystem evolving in the relative absence of disturbance (Belnap 1995, 1996). Therefore, this area is important in the study of how disturbance influences community dynamics, including species-species interactions, and for understanding how to restore these fragile systems. This also means that this area is highly susceptible to damage by different land uses, including recreation and grazing.</p>	Entire monument	<p>Belnap, 1995, 1996; Belnap et al., 1994; Mack and Thompson, 1982; Fleischner, 1994; Kleiner and Harper 1972; Harper et al., 1994; Webb, 1994; Rogers, 1982; Pickett and White, 1985; Moldenke, 1995; Evans and Ehleringer, 1993; Turner et al. 1993; Iverson et al. 1981; Webb and Wilshire 1981; Larsen 1996; Bowers et al. 1994</p>
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Isolation of this area has resulted in minimal human impacts. Many of the ecosystems found in this area have received little, if any, human use and the type and extent of disturbance has that has occurred is known. In addition, there are large areas unbroken by roads. This is essential to the protection and conservation of plant and animal species.	Entire monument	Wilcox et al 1986; Wilcox and Murphy 1985; Mader et al., 1990; Osley, et al., 1974; Rost and Bailey, 1979; Witmer and Calesta, 1985
The monument lacks any areas that have been invaded to any large extent by exotic species. There are few such areas in the Intermountain West, and they can provide invaluable information in understanding the ecology and dynamics of exotic plant invasion. These areas aid scientists in understanding what makes systems resistant to such invasions, and thus help land managers predict what areas are susceptible to invasion and restore already-invaded regions.	Entire monument	Billings, 1994; Fleischner, 1994; Forcella and Harvey, 1983; Gross, 1987; Hunter, 1990; Loope et al., 1988; MacMahon, 1987; Pellant and Hall, 1994
Six threatened or endangered candidate species are located within or near this area.	Wahweap WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Contains Peregrine falcon (endangered) and 6 special status animal species and 5 special status plant species.	Mud Spring WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Habitat for Swainson's hawk, golden eagle (Sensitive) and peregrine falcon (endangered).	The Blues WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Peregrine falcon and bald eagle (endangered). 8 animal and 5 plant species of special status.	Paria-Hackberry and Cockscomb WSA and Wahweap WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Thirteen species of raptors are known or suspected of nesting in the WSA	Burning Hills WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
Relict plant community in the upper part of Dry Valley "probably possesses important scientific values"	Mud Spring Canyon WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>

Unique relict plant community of pinion-juniper and sagebrush-grass park vegetation accessible only by a steep trail. One of the few remaining unaltered plant communities in Utah. No Man's Mesa RNA was designated as an ACEC in 1986. Such areas are invaluable to science. They provide restoration and management goals for administration of lands. Such areas are also critical to scientists who are trying to understand the natural functioning of ecosystems. Grasslands are especially valuable, as almost all have been heavily grazed for over a century.	Paria-Hackberry WSA (No Man's Mesa and Little No Man's Mesa)	<i>Utah BLM Statewide Final Wilderness EIS, 1990 and Kleiner and Harper, 1972</i>
Four Mile Bench Old Tree Area. Unique area of extremely old (1,400 years) pinon and juniper trees. Unique scientific values on over 1,000 acres.	Wahweap WSA	<i>Utah BLM Statewide Final Wilderness EIS, 1990</i>
This region is at the northern end of areas that receive summer monsoonal rains, and is at the southern end of areas that depends on winter rains. This distinction is very important to the physiological functioning of plants in this moisture-limited areas, as even minor changes in temperature and/or rainfall may lead to major differences in water availability, and consequently, plant metabolic processes. Climate change is expected to alter both rainfall timing and amount, as well as temperature. This, in turn, would alter plant physiology, water use patterns and community composition in this region, making the monument an excellent place for studying global climate change.	Entire monument	Ayyad 1981; Graff 1988; Van Devender and Spaulding 1979; Wagner 1981
Unlike most deserts that are primarily depositional environments, the CP is an erosional one (Welsh 1979; Nat Hist). This contributes to high endemism, as substrate material is not mixed. In addition, it makes this region highly susceptible to soil loss when surfaces are disturbed. This soil loss has a negative impact on plant and aquatic communities, as well as dam sediment loads.	Entire monument	Welsh, 1979; Harper et al., 1994

The effects of scaling up and down are not known for many ecological processes. The multitude of variably sized, discrete watersheds found in this area offer a unique opportunity to test the effects of scaling for hydrological and biological processes. In addition, the close spacing of these watersheds offers a chance to separate the effects of area <i>per se</i> from other environmental factors on community structure.	Entire monument	Allen and Hoekstra 1987; Reice 1994; Pickett and White 1985; Rosenweig 1985
Semi-arid and arid lands of the western United States are highly susceptible to desertification. The lack of natural disturbance in much of this area offers the opportunity to study the effects of different types and levels of land use and to better understand the steps leading to desertification.	Entire monument	Dregne, 1983
This area contains few exotic plants. Having this resource gives the opportunity to better understand what factors inhibit or facilitate exotic plant invasions. Roads have been heavily implicated in facilitating exotic plant invasion, while intact Cryptobiotic soil crusts and less favorable soil chemistry may inhibit such an invasion. Invasion could fundamentally alter these communities, by altering species composition, community dynamics and fire cycles.	Entire monument	Monsen and Kitchen, 1994; Kelly 1996; Harper and Marble 1988; Davidson et al. 1996
Quaternary resources are abundant in the monument. Pack rat middens enable reconstruction of paleoclimates and paleo-vegetation, while Pleistocene animal remains found in alcoves.	Entire monument	Harper et al., 1994
Unlike more mesic ecosystems, there is little evidence that desert communities demonstrate traditional successional sequences. There is little or no modification of soils or other site characteristics by previous-occurring plants. Understanding of this is important for restoration efforts. The monument offers an excellent opportunity to study this phenomenon independent of climate and disturbance factors.	Entire monument	Barbour, 1981; MacMahon, 1987; Shreve, 1942; Dott, 1996
Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 7 plant and 9 animal species considered sensitive.	Death Ridge and Fifty Mile Mountain WSAs	<i>Utah Statewide Wilderness Study Report</i> , 1991



Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 8 plant and 7 animal species considered sensitive.	Phipps Death Hollow ISA and Steep Creek WSA	<i>Utah Statewide Wilderness Study Report, 1991</i>
Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 9 plant and 7 animal species considered sensitive.	North Escalante Canyon, The Gulch and Carcass Canyon WSAs	<i>Utah Statewide Wilderness Study Report, 1991</i>



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Grand Staircase - Escalante National Monument  
List of Historic and Scientific Objects of Interest

Objects of Geologic Interest

Description: Perennial streams enter entrenched canyons in white Navajo and deep-red Wingate Sandstone. Deer Creek, Steep Creek, and The Gulch have perennial flows of clear cold water. The Gulch leads up into the spectacular Circle Cliffs where remarkable specimens of petrified wood (60 ft. logs) exist in the Morrison and Chinle formations.

Location: Escalante - Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: White Canyon cuts through the Kaibab Limestone to the Coconino Sandstone, the oldest stratum in the Upper Escalante drainage.

Location: Escalante - Studhorse Peaks unit

Source: Davidson, E.S., Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p. 10

Description: Big Spencer Flat Road and the V Road is site of "thunderball" iron concretions known as Moqui marbles. These oddities weather out of the Navajo sandstone and are a popular recreation feature.

Location: North Escalante Canyons WSA

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p. 16, and Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Waterpocket Fold tops out at Deer Point (7,243 feet). Most of the Waterpocket Fold is in the Capitol Reef National Park where it is a major landmark.

Location: Escalante - Colt Mesa unit

Source: Utah Wilderness Coalition. Wilderness at the Edge. p. 189, and Davidson, E.S., Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p. 61

Description: The inner gorges of the upper Moody Canyons cut into the relatively harder Kaibab Limestone and Coconino Sandstone (oldest exposed layer in this region).

Location: Escalante - Colt Mesa unit

Source: Utah Wilderness Coalition. Wilderness at the Edge. p. 189

Description: Dry Valley Creek Canyon. A waterfall blocks the entrance to Dry Valley Creek Canyon and consequently, the canyon remains in its natural condition. A perennial stream cuts through alluvial benches. It is relict and probably possesses important scientific values.

Location: Mud Springs Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The East Kaibab Monocline or the Cockscomb is unique as a Colorado Plateau structure. Its alignment with the Paunsaugant, Sevier, and Hurricane faults suggest that it too could be a fault at depth. It extends from the Colorado River north to Canaan Peak and is a major landmark.

Location: Kaiparowits Plateau - The Cockscomb WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Blues - a Cretaceous shale badlands, richly colored and contrasting with adjacent pink sandstone cliffs that forms a significant part of the vista for visitors to Bryce Canyon National Park. The Kaiparowits formation is well exposed here represents an accumulation of exceedingly rapid proportions and an immature sedimentary region which is not well displayed in any other formation in the Colorado Plateau.

Location: The Blues WSA (near Bryce Canyon)

Source: Welch, S.L., Rigby, J.K., Hamblin, W.K., A Survey of Natural Landmark Areas of the North Portion of the Colorado Plateau, 1980 p. 248

Description: Fiftymile Mountain is a complex of deep canyons, upwarps, monoclines, hogbacks and a spectacular 42-mile long Straight Cliffs wall, topping a thousand-foot-high cliffline of the Summerville, Morrison and Dakota formations. This complex marks the edge of the Kaiparowits Plateau.

Location: Kaiparowits Plateau - Fiftymile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Ancient coal fires of Right Hand Collet Canyon have left surface remains in the form of clinkers and deep red ash. These remains dominate the visual character of the drainage.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Arch. Span of 40 feet located in Calf Canyon, and is visible from the Alvey Wash road.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Burning Hills - naturally occurring underground coal fires have turned steep and rugged exposed hilltops a distinctive red.

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Devils Garden - oddly shaped arches (including Metate Arch) and rock formations in the hills at the foot of the cliffs marking the Kaiparowits Plateau.

Location: Carcass Canyon WSA (east of WSA)

Source: Utah BLM Statewide Final Wilderness EIS, 1990



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Description: This area possesses exceptional scenic values and contains a portion of the Cockscomb, a prominent southern Utah geologic feature. the Cockscomb forms 2 parallel knife-edged ridges with a bisection V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge. These major features of south central Utah cover over 4,000 acres.

Location: Mud Spring WSA.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: An interesting fold in Henrieville Creek along the northwest boundary of the WSA is of geologic interest and a sightseeing attraction.

Location: Mud Spring WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Window Wind Arch above the middle trail has scenic value because of its location on the very edge of the Straight Cliffs. The Straight Cliffs escarpment is major landmark in south-central Utah and an important scenic feature within view from the Hole-in-the-Rock road. Woolsey Arch is located in Rock Creek Basin, an area of colorful Navajo sandstone and high cliffs.

Location: Fifty Mile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Unique because it consists of 2 prominent southern Utah physiographic systems. It includes the eastern most extension of the White Cliffs component of the famous ascending staircase, cliff and terrace physiography, the Vermillion, White, and Pink Cliffs; and east of the Paria river, the dividing point is the landscape representative of the Glen Canyon physiography of sculptured, dissected, and exposed Navajo sandstone. The area where these merge between Deer Range and Rock Springs Bench is a highly scenic complex and colorful landscape.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: The Vermillion Cliffs with its associated Wingate Sandstone cliffs, colorful Chinle badlands, and canyons with there multiple colors and the intensity of coloration contribute to high scenic quality. Included in this landscape are Hackberry Canyon, Paria River Valley, Hogeye Canyon, the Pilot Ridge-Starlight Canyon-Kirbys Point area and Eight Mile Pass.

Location: Paria-Hackberry WSA.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: An area of high scenic value include the breaks of the Rush Beds and the west wall of Cottonwood Canyon, upper tributaries to Hackberry Canyon, Death Valley Draw, and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Four ONA's designated to preserve "unique scenic values and natural wonders". North Escalante Canyon (5,800 acres), The Gulch (3,430), Escalante Canyons (480 acres), Phipps-Death Hollow (12 more outside WSA)

Location: North Escalante Canyons WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Location: North Escalante Canyons/The Gulch ISA

Description: This area is geologically complex and has some of the most outstanding canyon scenery in the country. Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: A unique feature of the Burning Hills is the red coloration in the landscape is the result of geological changes attributed to the naturally occurring coal fires. The coloration creates a highly scenic area.

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The White Cliffs are high white or yellow cliffs of Navajo Sandstone. Vary in height from 600' at Deer Springs Point bench to 1,200' at Deer Springs Point and the Sheep Creek Bull Valley Gorge-Paria River confluence. The cliffs consistently reach a 1000' in height and the cliffline is interrupted by 8 canyons.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: This area contains twenty-four undeveloped springs. Ten are located in upper Paria, 6 in hackberry, 5 on the eastern border of Cottonwood Creek, and 3 on west boundary. There are also 6 developed springs. These are significant features in this arid environment.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Phipps-Death Hollow ONA (12/23/70) contains 34,288 acres managed to preserve scenic values and natural wonders.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Arches. Peek-a-boo Rock, Wahweap Window, Jacob Hamblin Arch, Starlight Arch, Cobra Arch, Sam Pollack Arch, Woolsey Arch, and several more unnamed arches and natural bridges.

Location: Kaiparowits Plateau and adjacent areas

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.

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Description: Sand-calcite crystals from the Morrison Formation. These crystals are the first reported occurrence from rocks of Jurassic age and only reported sand crystals in southern Utah.

Location: Kaiparowits Plateau

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p. 18

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Description: Circle Cliffs in the northeast portion of WSA features intensively colored red, orange, and purple Chinle mounds and ledges at the base of Wingate Sandstone cliffs. Vertically jointed cliffs banded with red, yellow, and white colors and bench tops and upper cliff faces possess innumerable orange-red Kayenta Sandstone knobs. One of most spectacular and distinctive landscapes on the Colorado Plateau.

Location: Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Area includes Escalante Natural Bridge (130' high, 100' span) and 4 other natural bridges and arches.

Location: Phipps-Death Hollow WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: The Gulch is a major geologic feature. Deeply entrenched very sheer red straight line Wingate Sandstone walls. High ridges and slickrock peaks. Ridges drop fairly abruptly to canyons below.

Location: Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Lamanite Natural Bridge. Actually a large arch with good symmetry and form. Located in an impressive setting in a deep side canyon to The Gulch.

Location: Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Petrified wood. Upper Gulch-Circle Cliffs contains large, unbroken logs of petrified wood (NEA 2,213 acres). Maximum log length 36'. The scenic values of these logs is enhanced by their colorful surroundings.

Location: Steep Creek WSA

Source: Utah Statewide Wilderness EIS, 1990 W FEIS 3B 19, and Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p.13.

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Description: Outstanding scenic values include the upper portion of Paradise Canyon where sandstone in the Wahweap Formation outcrops as colorful walls and cliffs. Ponderosa pine growing in the sandstone enhance the scenic values. Two sandstone monoliths or fins above Alvey Wash are prominent geological features.

Location: Death Ridge WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: The area contains a unique canyon and bench system. The entire ISA contains outstanding scenery. Examples include the area east of Horse Canyon. Four canyons have isolated 10 benches of varying size. Many bench tops have intricate pattern of innumerable orange-red Kayenta Sandstone knobs. Wolverine Canyon and Death Hollow have extremely narrow and convoluted sections. Another feature, Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.

Location: North Escalante Canyons/The Gulch ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Mollie's Nipple, an erosional remnant is a major landmark in the area.

Location: Kaiparowits Plateau.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Natural Arches. Sam Pollock Arch, located at the head of a tributary drainage of Hackberry Canyon, and Starlight Arch located west of No Man's Mesa.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Area of diverse geology represented by spectacular deep canyons. The Escalante River canyon is 1100 feet deep. The canyon walls are rough and broken and the canyon is narrow and it meanders. Pure white to golden sandstone has been eroded into expanses of slickrock. Death Hollow Canyon is 1,000' feet deep and meandering. The extensive upper basin through which Mamie Creek flows is a extremely dissected area of canyons, tanks, other formations. Red layers of Carmel Formation cap high mesas and ledges of the exposed Kayenta Formation.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Petrified wood deposits just west of the Old Paria Townsite and in Hackberry Canyon. Both are in the Chinle formation.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: All the topographic features of the Kaiparowits region have been developed in sedimentary rocks. The Kaiparowits Plateau is a slightly tilted sedimentary mass that extends as a narrow mesa from the High Plateaus to Glen Canyon 70 miles distant. Its culminating point, Canaan Peak is an outlier of the Table Cliff Plateau; the Paria Plateau is a huge block of sandstone, the Waterpocket monocline is a ridge of folded rock intricately dissected and flanked by hogbacks, and the broken "comb" in the vicinity of Paria is the edge of sandstone beds upturned in the East Kaibab fold. The Circle Cliffs are inward-facing walls of sandstone that rim an oval depression. These prominent features are but large-scale examples of the mesas, buttes, and ridges that characterize the landscape of southern Utah.

Location: Kaiparowits Plateau region



Source: Gregory, H.E. and Moore, R. C. The Kaiparowits Region: A Geographic and Geologic Reconnaissance of Part of Utah and Arizona. 1931.

Description: Paria River from Colorado River to its source, identified by NPS as possessing values that may be of national significance, potential to be included in the National Wild and Scenic River System.

Location: Paria-hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Escalante River from Lake Powell to its source, a section of 14.9 miles, was designated as for study as a candidate Wild and Scenic River by the Secretary of the Interior on 10/11/70.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Lower Calf Creek Falls. Calf Creek Canyon is characterized by red alcoved walls, 2 waterfalls, and extensive expanses of white slickrock. Lower Calf Creek Falls drops 126' and Upper Calf Creek's drop is 86'. High educational values associated with interpretation of these areas.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The area contains 40 miles of perennial streams, a significant feature in this arid environment.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

#### Objects of Paleontologic Interest

Description: Fossil assemblage photographs. Typical mollusks from Tropic Shale, south of Escalante include straight cone cephalopods, ammonites, gastropods, and pelecypods and Cretaceous sharks teeth from the Straight Cliffs Formation.

Location: Kaiparowits Plateau

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. pp 14-15

Description: Gray Cliffs/Pink Cliffs - This sequence of rocks may contain one of the best and most continuous records of Late Cretaceous terrestrial life in the world. Formation has yielded early mammals, lizards, dinosaurs, crocodillians, turtles, mollusks.

Location: Kaiparowits - The Blues WSA

Source: BLM, Escalante/Kanab RMP - Grand Staircase Ecosystem Analysis, 1994

Description: Fossils deemed by the Museum of Northern Arizona in a 1976 study to be of major importance. They are found in the Cretaceous Wahweap Formation outcrops include abundant fragments of turtle shells and dinosaurs, as well as several crocodile teeth. There is an excellent chance that mammal fossils will

be found

Location: Kaiparowits Plateau - Nipple Bench unit

Source: BLM, Kaiparowits power project environmental impact statement, 1976

Description: The Straight Cliffs Formation is limited to the southern Utah area. It contains primitive mammals including one of the potentially oldest marsupial fossils identified.

Location: Kaiparowits Plateau

Source: BLM, Warm Springs Project Preliminary Draft EIS, 1996

Description: Invertebrate and vertebrate specimens found Straight Cliffs, Tropic Shale, and Dakota Formations. 13 collection sites recorded (gastropods, cephalopods in upper Cretaceous Formations, vertebrate in Dakota and Tropic Shales). Likely to occur along entire length of the Straight Cliffs

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Kaiparowits is of interest in understanding the evolution of mammals and other terrestrial vertebrates. Very little is known of Cretaceous mammals prior to the latest part of that period. The mid-Cretaceous mammalian twilight zone is spanned by the fossiliferous, terrestrial rock units of the Kaiparowits region. They contain unique evidence bearing on the early diversification of important mammalian groups of the Late Cretaceous. The thickness, continuity, and broad temporal distribution of the Kaiparowits sequence provides the opportunity to document changes in terrestrial vertebrate assemblages over a wide span of Late Cretaceous time.

Location: Kaiparowits Plateau

Source: Eaton, Jeffrey G, and Cifelli, Richard L. Preliminary report on Late Cretaceous mammals of the Kaiparowits Plateau, southern Utah, 1988

Description: Extremely significant fossils including marine and brackish water mollusks, turtles, crocodillians, lizards, dinosaurs, fishes, and mammals have been recovered from the Dakota formation, Tropic shale, Straight Cliffs Formation (Tibbet Canyon, Smoky Hollow, and John Henry members), and Wahweap formation in the area around the proposed Andalex mine and some localities lie directly along the proposed haul routes. This sequence of rocks (including the overlying Wahweap and Kaiparowits formations) contain perhaps the best and most continuous record of Late Cretaceous terrestrial life in the world

Location: Kaiparowits Plateau

Source: Eaton, Jeffrey G., Personal correspondence to Mr. Mike Noel, BLM, 1991

## Objects of Prehistoric Interest 1996

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Description: Sixty sites have been recorded and the potential for additional sites is exceptionally high. Sites discovered to date include lithic scatters, 13 rockshelters (some w/storage cysts and rock art), 1 pithouse village site and 1 structure (probably of Anasazi origin). Some of the rock art and rock shelter and 1 campsite are potentially eligible for nomination to the NRHP.

Location: North Escalante Canyons/The Gulch ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Friendship Cove Pictograph site nominated to NRHP. This site consists of a set of large Fremont style pictographs painted on the face of a large sandstone cliff.

Location: Phipps-Death Hollow ISA, eastern part

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Forty-four sites of diverse types have been recorded in the area. 14 rock art (petroglyph and pictographs sites (2 from Fremont culture), 1 Pithouse village site, lithic scatters of Paiute and Anasazi, and 6 rockshelters have been discovered. Potential for more sites is good.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Situated at the intersection of three major prehistoric cultures the Plateau has long been a magnet for archeological study. It has been recognized that the Kaiparowits Plateau might contain important clues that would aid in answering questions in the archeology of the Southwest.

Location: Kaiparowits Plateau

Source: Utah Wilderness Coalition. *Wilderness at the Edge*, p. 147 and Lister, Florence C., *Kaiparowits Plateau and Glen Canyon prehistory, an interpretation based on ceramics*, 1964

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Description: Fiftymile Mountain Archeological District contains more than 400 sites including Anasazi habitations and granaries. Important scientific value. Some of the most significant cultural resources in the Four Corners area. Archaeological District (47,325 acre) has been nominated to NRHP. Majority of sites are masonry structures (of 1-10 rooms). Most are of Virgin Anasazi origin but include sites attributed to Fremont, Hopi, and Paiute. Navajo are also expected of occupying the area. 4,000 total sites may be located in WSA.

Location: Fiftymile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Sixty-five sites have been recorded. They include lithic and ceramic scatters, masonry structures (granaries and storage cysts), one rock shelter. Masonry and some lithic/ceramic associated with Virgin Anasazi/Virgin-Kayenta Anasazi. Two are Pueblo II-III time period. Some sites are associated with Paiute-age or Archaic-age peoples. At least 8 sites in this area are eligible for nomination to the NRHP.

Location: Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: High concentration of prehistoric sites. Although surveys are incomplete for the Warm Creek unit more that 600 sites have been found ranging from lithic scatters and campsites to rockshelters.

Location: Kaiparowits Plateau/Warm Creek unit

Source: BLM, Kaiparowits power project environmental impact statement, 1976

Description: Part of a larger area extensively used by the Kayenta Anasazi and later the Southern Paiute Indians. Site densities expected to be moderate to high.

Location: Kaiparowits Plateau/Squaw Canyon unit

Source: ERT, 1980, Kaiparowits coal development and transportation study, final report

Description: Prehistoric site densities are high on top of Nipple Bench. Sites represent Fremont, Virgin Anasazi and Kayenta Anasazi. The sites represent complex associations of features and artifacts and indicate permanent or extensive camps in rock shelters.

Location: Kaiparowits Plateau/Nipple Bench unit

Source: Fish, Paul, Preliminary Report Kaiparowits Power Project

Description: Six sites have been recorded. One is Pueblo II Anasazi occupation site, with others unidentified.

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: One hundred-five sites (primarily lithic scatters) have been recorded covering a broad period of occupation. Ten rockshelters w/storage cysts or storage caches, 1 w/masonry room, 3 w/granaries associated with Anasazi or Fremont have been discovered. Additional sites include petroglyph and pictograph panels associated with shelter sites and 1 burial site.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: One hundred thirty-four documented sites represent virtually all known prehistoric cultures in southern UT (Archaic, Fremont, Anasazi, Southern Paiute). 8,000 years of prehistory are represented. The sites primarily represent temporary habitation by hunter gatherers..

Location: Death Ridge WSA

Source: BLM Utah Statewide Wilderness EIS, 1990, and Hauck, F.R., Cultural Resource Evaluation of South-Central Utah, 1977-1978

Description: The area contains 41 recorded sites and based on surveys may contain exceptionally high densities of sites.. Known sites include



rockshelters, pit houses, lithic scatters, and masonry structures. Pictograph panels are in Deer Creek Canyon and petroglyphs are found in Snake Creek Canyon. A study located and estimated 612 sites per 23,000 acres, 564 potentially eligible for nomination to the NRHP (southern border of WSA). Another inventory estimated 360 sites per 23,000 acres at the northern border of the WSA.

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Location: Paria-Hackberry WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: The Kayenta Pueblo culture inhabiting the Straight Cliff and portions of the Escalante River drainage between A.D. 1000 and 1200 were likely in contact with the Fremont culture. Although both inhabited the area at the same time and competed for limited agricultural lands there is no evidence of open conflict during this time. Some modifications of pottery making techniques between the two cultures indicates that there was trade and exchange between them. Little is known positively about the Kayenta culture, and additional research in this area could provide valuable insight on interactions between the two cultures.  
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Location: Straight Cliffs WSA  
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Source: Lister, Kaiparowits Plateau and Glen Canyon Prehistory: An interpretation based on ceramics. 1964.

## Objects of Historic Interest

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Description: Dance Hall Rock/Hole-in-the-Rock Trail. While the Hole-in-the-Rock Trail was under construction in 1879, Mormon Pioneers camped at Fortymile Spring and held meetings and dances in the shelter of Dance Hall Rock. Designated historical site by DOI 1970.

Location: Two miles west of the Glen Canyon NRA on the Hole in the Rock Trail

Source: Utah Wilderness Coalition. Wilderness at the Edge. - p. 182

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Description: Historic route constructed in 1879 to provide access from Escalante to areas on the opposite side of the San Juan River in Southeast Utah.

Location: Historic trail running from Escalante to Hole in the Rock in Glen Canyon NRA

Source: Lambrechtse, Rudi. Hiking the Escalante, 1985

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Description: Boulder Mail Trail. Used to carry mail between Escalante and Boulder beginning in 1902. Much of trail still visible where necessary to construct through slickrock. Nominated to NRHP. Popular backpacking route.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Boynton Road. Constructed 1909 as short cut between Escalante and Salt Gulch. Abandoned after 2 years because of flooding. Visible over approx 9 of its 10 miles.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Escalante-Boulder telephone line: First Boulder-Escalante telephone line constructed by Forest Service in 1911 providing first phone service to area. Still visible between Antone Flat and Sand Creek.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Washington Phipps grave. A historical grave site of an early pioneer shot in 1878 in a dispute with his partner John Boynton. Provided the namesake for the area.

Location: Phipps Death Hollow

Source: Lambrechtse, Rudi. Hiking the Escalante, 1985

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Description: Old Boulder Road. Main route between Escalante and Boulder until the CCC built Hell's Backbone Road and Highway 12 in 1930's to replace it.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: The Hattie Green mine, an early copper working located on the crest of The Cockscomb.

Location: The Cockscomb WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Old Paria Townsite was established in 1874 on the bench above the eastern bank of the Paria River by Mormon settlers who attempted to farm the bottomlands. Site was abandoned in 1890.

Location: adjacent to Paria-Hackberry WSA

Source: Abby, Edward and Hyde, Philip. Slickrock p.46

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Description: Old Paria Townsite movie set. Built in the 1960's to film several movies. Now abandoned but still a popular recreation destination.

Location: adjacent to Paria-Hackberry WSA

Source: Abby, Edward and Hyde, Philip. Slickrock p.46

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## Objects of Biological Interest

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**Description:** Riparian zones are corridors for many of the region's species, including neotropical migrant birds. The corridors (including the Escalante, and Paria Rivers and Johnson Creek and their tributaries) bisect the region north to south, allowing for exchange of individuals among different animal populations. The importance of movement corridors to the long term viability of animal populations is of great scientific and management interest. This area would afford many opportunities to enhance this ecological issue.

**Location:** Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab including the Escalante, Paria rivers and Johnson Creek

**Source:** Edwards, Tom, 1996; Knopf, 1985; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

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**Description:** 25 miles of riparian corridor in unit. Connects mountains to desert lowlands. Has great concentration of hanging gardens and riparian vegetation, including relictual populations in canyon bottoms. Also supports many rock crevice communities. Connects other protected areas. High plant endemism, due to large extent of parent material exposure.

**Location:** Escalante River

**Source:** BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

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**Description:** Riparian corridor links high country to lowland desert scrub. Connects protected areas. Has high concentrations of isolated communities: hanging garden, rock crevice and canyon bottom communities. Also has an abundance of packrat middens.

**Location:** Paria River

**Source:** Van Devender and Spaulding, 1979; BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

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**Description:** Fifty miles of perennial streams including the Paria River (which is a wild and scenic river inventory segment). Riparian vegetation covers 500 acres.

**Location:** Paria-Hackberry WSA

**Source:** Utah BLM Statewide Final Wilderness EIS, 1990



Description: Three major floras meet in this area. Plants from the Mojave, Arizona deserts and northern Utah are all found here, with a few species from the Great Plains. The Colorado Plateau is surrounded by high mountains, isolating the flora and fauna. Unlike many ecosystems, the plant density, diversity and stature within the monument is determined more by substrate than climate. Consequently, isolation, plus the great diversity of substrates (providing a wide range of soil chemistry and physical characteristics) found within close proximity to each other has resulted in a high level of plant endemism in this area. Eleven species found in the monument are found nowhere else in the world. Of plants that occur only in Utah or on the Colorado Plateau, 125 species occur in the monument. The Canyonlands portion of the Colorado Plateau, much of which is contained in the monument, is considered the richest floristic region in the Intermountain West, and contains 50% of Utah's rare and endemic plants. 90% of these rare and endemic species are found on substrates typical of most of the monument. Of the Canyonlands area, the monument area is considered one of the most significant for endemic populations, with more than 10% of the flora being found no nowhere else.

Of additional significance is that many of the plants in the monument are diploid species. This means they represent the basic genetic stock from which polyploid species in the area evolved. This makes this area of great significance to plant evolutionary biologists and provides a unique opportunity to study the evolution and speciation of plant species, as well as the structure and dynamics of plant communities, independent of climate.

Location: Entire monument

Source: Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977; Utah Natural Heritage Program plant database

Description: The Colorado Plateau was uplifted and downcut without deformation. As a consequence, large areas of unmixed geologic parent materials are exposed, and plants must adapt to large array of highly distinct parent materials. These substrates are sharply demarcated, and often occur within a few meters of each other. This situation offers the unique opportunity to examine the role of soil physical and chemical characteristics in determining plant and animal community structure independent of climatic variables, an important ecological question. It also results in different plant community structure and dynamics than is generally observed in other ecosystems. This area contains shales, siltstones, mudstones, sandstones and limestone of differing depths, and deposited in a variety of environments (marine, freshwater and eolian). Each soil depth and depositional environment has very different chemical and physical characteristics. As a result, there is a great diversity of substrates in this area, each supporting a unique plant community.

Location: Entire monument

Source: Hintze, 1988; Nabhen and Wilson, 1996; Gross, 1987; Dott, 1996; Roberts, 1987

Description: The presence of steep elevational gradients gives the opportunity to sort out the role of temperature and precipitation in structuring plant and animal communities. Elevational gradients have traditionally been used by scientists as a way of examining factors controlling biotic community structure. Juxtaposition of diverse substrates and elevational gradients gives an unparalleled opportunity to determine the respective roles of soil chemistry, physical characteristics, elevation, rainfall and temperature in structuring biotic communities. In addition, it allows for high biodiversity in a small area.

Location: Entire monument

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 Source: Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977

Description: The Escalante Plateau is the home to approximately 300 species of amphibians, birds, mammals, and reptiles. This diverse set of wildlife species includes over 20 species of birds of prey including the bald eagle, peregrine falcon, and was the historical range of the condor. The region contains 2 of the 7 recognized centers of endemism for fishes of the western United States.

Location: Escalante Plateau

Source: Davidson et al. 1996; Tom Edwards, 1996, Behnke, R.J., and Zar, M., 1976

Description: Contains many different geologic substrates (therefore soils with different physical and chemical attributes) in a small area. The majority of endemic in Utah are found on these particular substrates; consequently, this area is expected to have a high concentration of endemics.

Location: Escalante -along boundary of Glen Canyon NRA and Capital Reef National Park

Source: Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988

Description: Large expanses of fine-textured soils (Morrison, Mancos/Tropic) shales support large number of endemic plant species, fossils.

Location: Henrieville to Escalante

Source: Hintze, 1988; Shulz, 1993; BLM Wilderness EIS

Description: An exposed monocline with many soils/substrates in close juxtaposition provides tremendous biodiversity of both general and endemic flora. High salt content of stream provides habitat for salt-tolerated riparian plants. Provides a elevational gradient from ponderosa pine to desert scrub. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.

Location: The Cockscomb

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996;

Description: Contains a concentration of many different geologic substrates/soils with different physical and chemical attributes. This area has a high concentration of endemics. This boundary also abuts protected areas (Glen Canyon, Capitol Reef), thereby effectively increasing the value of all three areas for biological conservation. In addition, the Waterpocket Fold has isolated two outcrops of the same parent material. These two areas now support different floras. This presents an outstanding scientific opportunity to explore processes of speciation.

Location: Far eastern boundary

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam,

1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

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Description: This is an exposed monocline. Consequently, many substrates (Summerville, Morrison, Dakota, Tropic, Entrada, Navajo, Wingate and Carmel) are exposed directly next to each other, providing an opportunity for studies of ecological processes independent of climate. This monocline also has an elevational gradient, facilitating the study of effects of temperature and moisture on community dynamics. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.

Location: Straight Cliffs area

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978.

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Description: Diversity of plant life ranging from low desert shrub to Ponderosa Pine (less than 1 mile apart) enhances the study and observation of ecology. 3 small stands of Ponderosa pine in Alvey Wash.

Location: Death Ridge WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Contained within the monument are 3-5 spatially separated areas where the same substrates are exposed in close proximity to each other. In addition, there are 5 elevational gradients along riparian corridors. This is critical for replicated scientific work to be conducted.

Location: Entire monument

Source: Hintze, 1988; USGS Topographical Maps

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Description: Riparian corridor with elevational gradient, connecting desert low lands to the high country. Vermillion, White, Pink Cliffs (Triassic, Jurassic, Cretaceous material).

Location: Johnson's Creek

Source: Hintze, 1988; USGS Topographical Maps; Beier, 1993; Noss, 1992, 1993

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Description: Fifty Mile Mountain. Presence of aspen on Pleasant Grove, Steer Canyon, and Pinto Mare Canyons.

Location: Fifty Mile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Protects lands at low elevation sites frequently rich in species diversity. The range of elevation in these areas from approximately 4500-8300 feet encompasses a wide variation in elevation and will capture the full diversity of plant and animal species in the region.



Location: Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab

Source: Hintze, 1988; Utah BLM Final Wilderness EIS, 1990

Description: The monument contains an abundance of hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket and rock crevice communities. These small, isolated populations often contain unusual, often relictual plants and animals. Hanging gardens and canyon bottom communities harbor riparian plants and their pollinators, as well as unique vertebrates (bats and small mammals) and soil fauna. Tinajas are important aquatic resources, and contain a diverse array of tadpole, fairy and clam shrimp, amphibians, algae, water beetles, other crustaceans, snails, mosquito and gnat larvae and aquatic/riparian plants. Highly saline areas are found around many seeps and streams, and consist of plants and animals adapted to highly saline conditions. Dunal pockets contain species adapted to shifting sands, while rock crevice communities consist mostly of slow-growing species that can thrive in extremely infertile sites. These communities offer a chance to examine gene flow dynamics, and to distinguish the respective role of pollen versus seeds. They offer an opportunity to study ground water flow dynamics in the absence of significant fluvial processes, and island biogeography of plants, pollinators and ground-dwelling biota. They also are highly simplified, discrete ecosystems, making them ideal for elucidating basic ecosystem processes.

Location: Entire monument

Source: Nabhen and Wilson, 1996; Harper et al., 1994; Welsh et al., 1993; May et al., 1995; Fowler et al., 1995; Graff, 1988

Description: These canyons provide a high concentration of isolated, unique plant and invertebrate communities: hanging garden, rock crevice, and canyon bottom communities. Many relictual plant species can be found in these communities. Pack rat middens are abundant, providing paleoclimate and paleo-vegetation information.

Location: Escalante Canyons

Source: Axelrod, 1960; BLM Wilderness EIS; Van Devender and Spauling, 1979; Fowler et al., 1995; Nabhen and Wilson, 1996

Description: Dunal pockets contribute Great Plains species to the flora. These are unique, isolated plant communities.

Location: Cockscomb to Kaiparowits

Source: Hintze, 1988

Description: Unique, isolated communities are located throughout the monument. These include hanging gardens, tinajas, canyon bottom, dunal pocket, salt pocket and rock crevice communities. They provide great opportunities for examining evolution, gene flow, island biogeography and other ecological principles.

Location: Entire monument

Source: Case and Cody, 1988; Diamond, 1981; Dott, 1996; Harris, 1984; Ludwig and Whitford, 1981; Fowler et al., 1995; Nabhen and Wilson, 1996; Roberts, 1987; Reice, 1994; Axelrod, 1960

Description: Biological conservation theory and literature suggests that large contiguous conservation areas increase both extent and probability of population survival, increases protection of migratory pathways, and is the most effective



means of conserving aquatic and riparian communities.

Location: Entire monument

Source: Soule, 1987; Davidson et al., 1996; Miller, 1961; Minckley and Deacon, 1968; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: The connection with Glen Canyon provides a larger protected area. It also provides low desert vegetation as part of the vegetational gradients. Large areas are important for maintaining the evolutionary potential of plants and animals, allowing for the exchange of genetic material among the separate populations that constitute a population.

Location: Common boundaries and riparian connections with Glen Canyon NRA, Capitol Reef NP, Box Hollow Wilderness and Paria Wilderness

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: Cryptobiotic soil crusts are critical for soil stability, nutrient availability for vascular plants and normal soil surface temperatures. These crusts are extremely fragile and easily disrupted by soil surface disturbances such as trampling or off-road vehicles. Since the soils in the monument are highly susceptible to erosion, it is important that these biocrusts be protected so they stabilize these erodible soil surfaces. In addition, these ecosystems have few nitrogen-fixing plants. Since these crusts provide nitrogen to these soils, they are a critical part of these nitrogen-limited ecosystems.

Location: Entire monument

Source: Belnap, 1994, 1995; Belnap and Harper, 1995; Belnap et al., 1994; Jefferies, 1989; Harper and Marble, 1988; Johansen, 1993; Mack and Thompson, 1978; Fleischner, 1994

Description: Disturbance of most soil surfaces in the monument area will result in soil surface temperature changes, as bio-crusts are darker than the substrates underneath them. The expected lowering of temperature with disturbance would result in cooler soil temperatures, and thus later spring plant germination and lower nutrient uptake rates. This may adversely effect desert plant growth in early spring. Surface temperatures also influence foraging and burrowing patterns for many soil invertebrates, and many effect community dynamics of these species.

Location: Entire monument

Source: Ludwig and Whitford 1981; Belnap 1995

Description: Ecosystems in this area are some of the most stable documented to date, as both large and small scale disturbances are limited spatially and temporally. Very little of this area was glaciated in the Pleistocene. Most plant communities evolved without fire or grazing by large ungulate herds, as

evidenced by characteristics of the soils and the flora. Catastrophic events are minimal, with the exception of wash bottoms. Microsite disturbances are minimal as well, as most soils support very low populations of invertebrates. 1880 photos repeated in 1990 show many sites virtually unchanged, with the same tree, shrub and grass individuals present, indicating very low species turnover rates in this region relative to other ecosystems. In addition, dead tree branches can still be found in virtually the same condition as they were 100 years ago, indicating plant tissue decomposition rates are extremely low in this region. This makes this area highly unique, as most ecosystems are believed to be structured disturbance. In this region, ecological processes can be studied independent of the effects of disturbance to give us greater insight into their functioning (i.e. factors controlling exotic plant invasions, species-species interactions, etc.)

Soil physical, chemical and biological features appear to be both easily damaged (low resistance) by surface disturbance and have very slow recovery rates (low resilience) when compared to other deserts or more mesic systems. This may be a result of evolution of this ecosystem evolving in the relative absence of disturbance (Belnap 1995, 1996). Therefore, this area is important in the study of how disturbance influences community dynamics, including species-species interactions, and for understanding how to restore these fragile systems. This also means that this area is highly susceptible to damage by different land uses, including recreation and grazing.

Location: Entire monument

Source: Belnap, 1995, 1996; Belnap et al., 1994; Mack and Thompson, 1982; Fleischner, 1994; Kleiner and Harper 1972; Harper et al., 1994; Webb, 1994; Rogers, 1982; Pickett and White, 1985; Moldenke, 1995; Evans and Ehleringer, 1993; Turner et al. 1993; Iverson et al. 1981; Webb and Wilshire 1981; Larsen 1996; Bowers et al. 1994

Description: Isolation of this area has resulted in minimal human impacts. Many of the ecosystems found in this area have received little, if any, human use and the type and extent of disturbance has that has occurred is known. In addition, there are large areas unbroken by roads. This is essential to the protection and conservation of plant and animal species.

Location: Entire monument

Source: Wilcox et al 1986; Wilcox and Murphy 1985; Mader et al., 1990; Osley, et al., 1974; Rost and Bailey, 1979; Witmer and Calesta, 1985

Description: The monument lacks any areas that have been invaded to any large extent by exotic species. There are few such areas in the Intermountain West, and they can provide invaluable information in understanding the ecology and dynamics of exotic plant invasion. These areas aid scientists in understanding what makes systems resistant to such invasions, and thus help land managers predict what areas are susceptible to invasion and restore already-invaded regions.

Location: Entire monument

Source: Billings, 1994; Fleischner, 1994; Forcella and Harvey, 1983; Gross, 1987; Hunter, 1990; Loope et al., 1988; MacMahon, 1987; Pellant and Hall, 1994

Description: Six threatened or endangered candidate species are located within or near this area.

Location: Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Contains Peregrine falcon (endangered) and 6 special status animal

species and 5 special status plant species.

Location: Mud Spring WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Habitat for Swainson's hawk, golden eagle (Sensitive) and peregrine falcon (endangered).

Location: The Blues WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Peregrine falcon and bald eagle (endangered). 8 animal and 5 plant species of special status.

Location: Paria-Hackberry and Cockscomb WSA and Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Thirteen species of raptors are known or suspected of nesting in the WSA

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Relict plant community in the upper part of Dry Valley "probably possesses important scientific values"

Location: Mud Spring Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Unique relict plant community of pinion-juniper and sagebrush-grass park vegetation accessible only by a steep trail. One of the few remaining unaltered plant communities in Utah. No Man's Mesa RNA was designated as an ACEC in 1986. Such areas are invaluable to science. They provide restoration and management goals for administration of lands. Such areas are also critical to scientists who are trying to understand the natural functioning of ecosystems. Grasslands are especially valuable, as almost all have been heavily grazed for over a century.

Location: Paria-Hackberry WSA (No Man's Mesa and Little No Man's Mesa)

Source: Utah BLM Statewide Final Wilderness EIS, 1990 and Kleiner and Harper, 1972

Description: Four Mile Bench Old Tree Area. Unique area of extremely old (1,400 years) pinon and juniper trees. Unique scientific values on over 1,000 acres.

Location: Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: This region is at the northern end of areas that receive summer monsoonal rains, and is at the southern end of areas that depends on winter rains. This distinction is very important to the physiological functioning of plants in this moisture-limited areas, as even minor changes in temperature



and/or rainfall may lead to major differences in water availability, and consequently, plant metabolic processes. Climate change is expected to alter both rainfall timing and amount, as well as temperature. This, in turn, would alter plant physiology, water use patterns and community composition in this region, making the monument an excellent place for studying global climate change.

Location: Entire monument

Sources: Ayyad 1981; Graff 1988; Van Devender and Spaulding 1979; Wagner 1981

Description: Unlike most deserts that are primarily depositional environments, the CP is an erosional one (Welsh 1979; Nat Hist). This contributes to high endemism, as substrate material is not mixed. In addition, it makes this region highly susceptible to soil loss when surfaces are disturbed. This soil loss has a negative impact on plant and aquatic communities, as well as dam sediment loads.

Location: Entire monument

Source: Welsh, 1979; Harper et al., 1994

Description: The effects of scaling up and down are not known for many ecological processes. The multitude of variably sized, discrete watersheds found in this area offer a unique opportunity to test the effects of scaling for hydrological and biological processes. In addition, the close spacing of these watersheds offers a chance to separate the effects of area per se from other environmental factors on community structure.

Location: Entire monument

Source: Allen and Hoekstra 1987; Reice 1994; Pickett and White 1985; Rosenweig 1985

Description: Semi-arid and arid lands of the western United States are highly susceptible to desertification. The lack of natural disturbance in much of this area offers the opportunity to study the effects of different types and levels of land use and to better understand the steps leading to desertification.

Location: Entire monument

Source: Dregne, 1983

Description: This area contains few exotic plants. Having this resource gives the opportunity to better understand what factors inhibit or facilitate exotic plant invasions. Roads have been heavily implicated in facilitating exotic plant invasion, while intact Cryptobiotic soil crusts and less favorable soil chemistry may inhibit such an invasion. Invasion could fundamentally alter these communities, by altering species composition, community dynamics and fire cycles.

Location: Entire monument

Source: Monsen and Kitchen, 1994; Kelly 1996; Harper and Marble 1988; Davidson et al. 1996

Description: Quaternary resources are abundant in the monument. Pack rat middens enable reconstruction of paleoclimates and paleo-vegetation, while Pleistocene animal remains found in alcoves.

Location: Entire monument



Source: Harper et al., 1994

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Description: Unlike more mesic ecosystems, there is little evidence that desert communities demonstrate traditional successional sequences. There is little or no modification of soils or other site characteristics by previous-occurring plants. Understanding of this is important for restoration efforts. The monument offers an excellent opportunity to study this phenomenon independent of climate and disturbance factors.

Location: Entire monument

Source: Barbour, 1981; MacMahon, 1987; Shreve, 1942; Dott, 1996

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Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 7 plant and 9 animal species considered sensitive.

Location: Death Ridge and Fifty Mile Mountain WSAs

Source: Utah Statewide Wilderness Study Report, 1991

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Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 8 plant and 7 animal species considered sensitive.

Location: Phipps Death Hollow ISA and Steep Creek WSA

Source: Utah Statewide Wilderness Study Report, 1991

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Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 9 plant and 7 animal species considered sensitive.

Location: North Escalante Canyon, The Gulch and Carcass Canyon WSAs

Source: Utah Statewide Wilderness Study Report, 1991

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The Colorado Plateau country of eastern Utah is divided into a number of plateau's, basins, and upwarps, natural divisions outlined by lines of cliffs or hogbacks of tilted rocks, and by abrupt changes in elevation. The layered rock in the southern part of this area are said to form a Grand Staircase. A succession of cliffs rising northward from the Grand Canyon at the Arizona border, edging the Kaiparowits Plateau. The successive risers are the Vermillion Cliffs, the White Cliffs, the Grey Cliffs, the Pink Cliffs, composed respectively of resistant Triassic, Jurassic, Cretaceous, Tertiary sedimentary rock layers—spanning 200 million years of geologic time. In places the uppermost tread is a final resistant lava cap. The steplike plateau surfaces range in elevation from 4,500 to 10,000 feet above sea level.

Roadside Geology of Utah by Halka Chronic

## **Bibliography of Sources Concerning Objects of Interest in the Grand Staircase - Escalante National Monument**

### **I. Geology resources**

#### **Mineral deposits**

Carey, Dwight, et al. Kaiparowits Handbook: Coal Resources (Los Angeles: Institute of Geophysics and Planetary Physics, University of California, 1975).

Doelling, Hellmut. Carcass Canyon Coal Area, Kaiparowits Plateau, Garfield and Kane Counties, Utah (Salt Lake City: Utah Geological and Mineralogical Survey, 1968)

Heylmun, Edgar. Paleozoic Stratigraphy and Oil Possibilities of Kaiparowits Region, Utah (Salt Lake City: Utah Geological and Mineralogical Survey, University of Utah, 1966, 1958).

Jepperson, Ronald, et al. The Kaiparowits Coal Project and the Environment: A Case Study (Ann Arbor: Ann Arbor Science Publishers; and Palo Alto: Electric Power Research Institute, 1981).

Kunkel, R. P., 1965. History of exploration for oil and natural gas in the Kaiparowits region, Utah, in Geology and resources of south-central Utah -- Resources for power: Utah Geological Society Guidebook to Geology of Utah 19, p. 93-111.

Sargent, K.A. Environmental Geologic Studies of the Kaiparowits Coal-Basin Area, Utah. U.S. Geological Survey Bulletin 1601, 1984.

Utah Coal for Southwest Gas Markets: A New Concept for Utah Coal and a New Industry for the Kaiparowits Plateau (Salt Lake City: Kaiser Engineers, 1977).

#### **Geology**

Baars, Donald. The Colorado Plateau: A Geologic History (Albuquerque: University of New Mexico Press, 1983).

Beus, Stanley and Morales, Michael, eds. Grand Canyon Geology. (New York, NY: Oxford University Press;

Professional Paper 220.

Gregory, H. E., 1948, Geology and geography of central Kane County, Utah: Geological Society of America Bulletin, v. 59, no. 3, p. 211-248.

Hintze, Lehi. Geologic History of Utah (Provo, UT: Brigham Young University Department of Geology. 1988).

Lewis, G.E., Irwin, J.H., and Wilson, R.F., 1961, Age of the Glen Canyon Group on the Colorado Plateau: Geological Society of America Bulletin, v. 72, no. 9, p. 1437-1440.

Lidke, K.J. and Sargent, K.A., 1983, Geologic cross sections of the Kaiparowits coal-basin area, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1033-J, scale 1:125,000.

Peterson, Fred. "Four New Members of the Upper Cretaceous Straight Cliffs Formation in the Southeastern Kaiparowits Region Kane County, Utah." 1969. Geological Survey Bulletin 1274-J

Plantz, Gearld G. Hydrologic Reconnaissance of the Kolob, Alton, and Kaiparowits Plateau Coal Fields, South-Central Utah. U.S. Geological Survey, Open-File Report 84-071. 1984

Sargent, K. A., and Hansen, D. E., 1976, General geology and mineral resources of the coal area of south-central Utah, with section on Landslide Hazards by Roger B. Colton, Coal Mine Subsidence by C. Richard Dunrud, and Landscape Geochemistry by J.J. Connor: U.S. Geological Survey Open-File Report 76-811, 122p.

Sargent, K.A., and Hansen, D.E., 1980. Landform map of the Kaiparowits coal-basin area, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1033-G, scale 1:125,000.

Shanley, Keith, "Predicting Facies Architecture Through Sequence Stratigraphy--An Example from the Kaiparowits Plateau, Utah." Geology, vol. 19, no. 7 (July 1, 1991) pp. 742-745.

Steed, R. H., 1954, Geology of Circle Cliffs anticline, in Geology of portions of the high plateaus and adjacent lands, central and south-central Utah: Intermountain Association of Petroleum Geologists Annual Conference, 5th, 1954, Guidebook, p. 99-102.

Stokes, William Lee. Geology of Utah. Utah Museum of Natural History.

Stratigraphy, Depositional Environments, and Sedimentary Tectonics of the Western Margin, Cretaceous Western



Elder, W.P. and J.I. Kirkland. 1993 Cretaceous Paleogeography of the Colorado Plateau and Adjacent Area. *in* M. Morales, ed. Aspects of Mesozoic Geology and Paleontology of the Colorado Plateau. Museum of Northern Arizona Bulletin 59. p. 129-152.

Miller, Wade E., Paleontological Literature Search of Alternative Plant Sites for the Utah Power and Light Company. 1975

### **III. Prehistoric resources (Anthropology/Archaeology)**

Barnes, F.A., Canyon Country Rock Art (Salt Lake City, UT: Wasatch Publishers, Inc., 1982).

Castleton, Kenneth, Petroglyphs and Pictographs of Utah, 2 vols. (Salt Lake City: Utah Museum of Natural History, 1979).

Cole, Sally J., Legacy on Stone: Rock Art of the Colorado Plateau and Four Corners Region (Boulder, CO: Johnson Books, 1990).

Fish, Paul, Preliminary Report for Archaeological and Ethnohistorical Phase I Consultation for the Kaiparowits Power Project: Proposed Plant Sites, Impact Study Area and Proposed Transmission Line Corridors, Museum of Northern Arizona, Department of Anthropology

Fowler, Don. 1961 Excavations, Kaiparowits Plateau, Utah (Salt Lake City: Department of Anthropology, University of Utah 1963) Anthropological Papers, University of Utah Department of Anthropology no. 66, Glen Canyon Series no. 20.

Gunnerson, James H., "Archeological Survey of the Kaiparowits Plateau" *in* The Glen Canyon Archeological Survey, Salt Lake City, University of Utah Press, 1959

Hauck, Forrest. Cultural Resource Evaluation in South Central Utah, 1977-78 (Salt Lake City, UT: U.S. Bureau of Land Management Utah Office Cultural Resource Series no. 4, final report for contract 14-08-0001-16494, 1979).

Janetski, Joel, ed.; University of Utah, Department of Anthropology, Archeological Center. Prehistoric and Historic Settlement in the Escalante Desert (Salt Lake City: University of Utah Press, 1981).

Gleave, Eva, ed. Journal-Stories of Elder Adelbert Twitchell, 1866-1950 (Salt Lake City: ?, 1979).

Lyman, Platte. Platte DeAlton Lyman Journal (Berkeley: University of California manuscript collection, 1879, 1894).

Miller, David. Hole-in-the-Rock: An Epic in the Colonization of the Great American West (Salt Lake City: Publisher's Press, 1966).

Reay, Lee. Through the Hole in the Rock to San Juan (Provo, UT: Meadow Lane Publications, 1980).

Smart, William. Old Utah Trails (Salt Lake City: Utah Geographic Series, 1988).

Smith, Albert, ed. Silas Sanford Smith: Pioneer, Statesman, Colonizer 1847-1910 (Provo, UT: Brigham Young University manuscript collection, 1963).

Woolsey, Nethella. The Escalante Story: A History of the Town of Escalante, and Description of the Surrounding Territory, Garfield County, Utah, 1875-1964 (Springville, UT: Art City Publishers, 1964).

## V. Biology resources

Albee, BJ, LM Shultz, and S Goodrich. "Atlas of the vascular plants of Utah". Occasional Publications 7, Utah Museum of Natural History. (Salt Lake City, UT: University of Utah, 1988).

Allen, TFH and TW Hoekstra. Problems of scaling in restoration ecology. (Cambridge, Great Britain: Cambridge University Press, 1981).

Armbruster, P and R. Lande. "A population viability analysis for African elephants: how big should a reserve be?". Conservation Biology, vol. 7, (1993) pp. 602-610.

Atwood, K, J Holland, R Bolander, B Franklin, DE House, L Armstrong, K Thorne and L England. Utah threatened, endangered and sensitive plant field guide. (USDA/USFS/BLM/NPS, 1991)

Axelrod, DI. 1960. The evolution of lowering plants. in Tax, S., Evolution after Darwin. The evolution of life., Vol. 1. (Chicago, IL: University of Chicago, 1960. pp. 227-305)

Billings, WD. "Ecological impacts of cheatgrass and resultant fire on ecosystems in the western Great Basin." *in* SB Monsen and SG Kitchen, eds, Proceedings: Ecology and Management of Annual Rangelands. (USDA INT-GTR-313, Ogden UT: 1994) pp. 2-30.

Brown, JH. "Mammals on mountaintops: nonequilibrium insular biogeography." American Naturalist. vol. 105, (1971) pp. 467-478.

Bowers, J.E., Webb, R.H., and Rondeau, R.J.. "Longevity, recruitment, and mortality of desert plants in Grand Canyon, Arizona, U.S.A." Journal of Vegetation Science, v. 6, (1995) p. 551-564.

Case, TJ and ML Cody. 1988. "Testing theories of island biogeography." American Scientist. vol. 75 (1988). pp. 402-411.

Chronic, H. Roadside geology of Utah. (Missoula, MT: Mountain Press Publishers, 1990).

Cronquist, A., AH Holmgren, NH Holmgren, JL Reveal. Intermountain Flora, vol 1. (New York, NY: Hafner Publishing, 1977).

Davidson DE, WD Newmark, JW Sites, DK Shiozawa, EA Rickart, KT Harper, and RB Keiter. "Selecting wilderness areas to conserve Utah's biological diversity". Great Basin Naturalist. vol. 56, (1996) pp. 95-118.

Davis, G. D. "Preservation of natural diversity: the role of ecosystem representation in wilderness." (Tampa, FL: Paper presented at the National Wilderness Colloquium. 1988)

Deacon, J.E. and Minckley, W.L. "Desert fishes." *in* Brown, G.W. ed, Desert biology, vol II. (New York, NY: Academic Press, 1974 ). pp. 385-488.

Diamond, JM. "'Normal' extinctions of isolated populations". *in* MH Nitecki, ed, Extinctions. (Chicago, IL: University of Chicago Press, 1981). pp. 191-246.

Dott, CE. Disturbance and plant communities in a dynamic landscape: canyons of southeastern Utah. (Madison, WI: Unpublished PhD dissertation, University of Wisconsin, 1996).

Dregne, HE. "Desertification of arid lands." *in* Dregne, H.E., ed. Advances in desert and arid land technologies and development, vol. 3. (Chur, Switzerland: Harwood Academic Publisher, 1993).

Harris, LD. The fragmented forest: island biogeography theory and the preservation of biotic diversity. (Chicago, IL: University of Chicago Press, 1984).

Harris, L. D., and P. B. Gallagher. "New initiatives for wildlife conservation: the need for movement corridors." in G. MacKintosh, ed. Preserving communities and corridors. (Washington, D.C., Defenders of Wildlife, 1989) pp. 11-34.

Heaney, LR. 1984. "Mammalian species richness on islands on the Sunda Shelf, Southeast Asia." Oecologia. vol. 61, (1984) pp. 11-17.

Henderson, M. T., G. Merriam, and J. Wegner. "Patchy environments and species survival: chipmunks in an agricultural setting." Biological Conservation. vol. 31, (1985) pp. 95-105.

Holden, PB, RA Stone, W White, G Somerville, D Duff, R Gervais, and S Gloss. 1974. "Threatened fishes of Utah". Proceedings of the Utah Academy of Science, Arts and Letters. vol. 51, (1974) pp. 46-65.

Hunter, R. 1990. "Recent increases in Bromus on the Nevada Test Site." in ED McArthur, EM Romney, SD Smith and PT Tueller, eds, Proceedings: Symposium on cheatgrass invasion, shrub die-off, and other aspects of shrub biology and Management. (Ogden, UT: USDA USFS Technical Report INT-GTR-276). pp. 22-25

Jeffries, Douglas. The Vegetation, Soil, and Cryptogamic Crusts of Blackbrush Communities in the Kaiparowits Basin (Phoenix: Arizona State University, 1989) Ph.D. dissertation, 1989.

IUCN. Categories, objectives and criteria for protected areas. (Morges, Switzerland: 1978).

Iverson, RM, BS Hinckley, RM Webb, B Hallett. "Physical effects of vehicular disturbance on arid landscapes." Science. vol. 212, (1981) pp. 915-917.

Johansen, JR. "Cryptogamic crusts of semiarid and arid lads of North America." Journal of Phycology. vol. 29, (1993) pp. 140-147.

Johnson, W. C., and C. S. Adkisson. "Dispersal of beech nuts by blue jays in fragmented landscapes." American Midland Naturalist. vol. 113, (1985) pp. 319-324.

Kershner, J. L. "Bonneville cutthroat trout." in M. K. Young, ed. Conservation assessment for inland cutthroat trout. (Ft. Collins, CO: Technical Report RM-GTR-256, USDA Forest Service, 1995) pp. 28-35.



ecology. (Cambridge, UK: Cambridge University Press, 1987).

Mader, HJ. 1984. "Animal habitat isolation by roads and agricultural fields." Biological Conservation. vol. 29, pp. 81-96.

Mader, H. J., C. Schell, and P. Kornacker. "Linear barriers to movements in the landscape." Biological Conservation. vol. 54, (1990) pp. 209-222.

May, CL, JF Fowler, and NL Stanton. in Van Riper, C III, Proceedings of the Second Biennial Conference on Research in Colorado Plateau National Parks. (NPS/NRNAU/NRTP-95/11. USDI-NPS. 1995).

Meffe, GK and CR Carroll. . Principles of conservation biology. (Sunderland, MA: Sinauer, 1994).

Michener, CD. 1979. "Biogeography of the bees." Annals of the Missouri Botanical Garden. vol. 66, (1979) pp. 277-347.

Miller, RR. "Origin and affinities of the freshwater fish fauna of western North America." in CL Hubbs, ed., Zoogeography. (AAAS Publication 51, 1959) pp 187-222.

Miller, RR. 1961. "Man and the changing fish fauna of the American Southwest". Papers, Michigan Academy of Science, Arts and Letters. vol. 46, (1961) pp. 365-404.

Minckley, WL and JE Deacon. . "Southwestern fishes and the enigma of 'endangered species'." Science. vol. 159. (1968) pp. 1424-1432.

Minckley, WL and JE Deacon. Battles against extinction: native fish management In the American West. (Tucson, AZ: University of Arizona Press, 1990).

Minckley, WL, DA Henderson, and CE Bond. "Geography of western North American freshwater fishes: description and relationships to intracontinental tectonism." in CH Hoscutt and EO Wiley, eds., The zoogeography of North American freshwater fishes. (New York, NY: John Wiley and Sons, 1986). pp. 519-613.

Moldenke, A. Soil microarthropods of Virginia and Chesler Parks, Canyonlands National Park, UT. Final report, National Park Service, Moab, UT. 1995.

Monsen, SB and SG Kitchen, eds, Proceedings: Ecology and Management of Annual Rangelands. (Ogden, UT:

Applied Ecology. vol. 11, (1974) pp. 51-59.

Patterson, BD. "Mammalian extinction and biogeography in the southern Rocky Mountains." in MH Nitecki, ed, Extinctions, (Chicago, IL: University of Chicago Press, 1984) pp. 247-293

Pellant, M and C Hall. "Distribution of two exotic grasses on intermountain rangelands." in SB Monsen and SG Kitchen, eds, Proceedings: Ecology and Management of Annual Rangelands. (Ogden, UT: USDA INT-GTR-313, 1994). pp. 109-112.

Pickett, STA and JN Thompson. "Patch dynamics and the design of nature reserves." Biological Conservation. vol. 13, (1978) pp. 27-37.

Pickett, STA and PA White. The ecology of natural disturbance and patch dynamics. (Orlando, FL: Academic Press, 1985).

Pimm, SL. "Community structure and stability." in ME Soule, ed. Conservation Biology: the science of scarcity and diversity. (Sunderland, MA: Sinauer Press, 1986).

Primack, RB. Essentials of conservation biology. (Sunderland, MA: Sinauer, 1993).

Raines, James. Modeling Studies of Small Mammal Trapping, Phenology, and Plant Succession in the Kaiparowits Region, Kane County, Utah (Provo: Brigham Young University, 1985, 1976); Ph.D. Dissertation, 1976.

Raven, PR. The nature and value of biodiversity. in Global biodiversity strategy: guidelines for action to save, study and use earth's biotic wealth sustainably and equitably. (WRI, IUCN, UNEP, 1992). pp. 1-18.

Reice, SR. "Non-equilibrium determinants of biological community structure." American Scientist. vol. 82, (1994) pp. 424-435.

Roberts, L. "A dynamical systems perspective on vegetation theory." Vegetation. vol. 69, (1987) pp. 27-33.

Rogers, GF. Then and Now. (Salt Lake City, UT: University of Utah Press, 1982).

Rosenweig, ML. 1987. "Restoration ecology: a tool to study population interactions?" in WR Jordan and ME Gilpin, eds, Restoration ecology. (Cambridge, UK: Cambridge University Press, 1987).

American Naturalist. vol. 140, (1992) pp. 893-911.

Terborgh, J and B Winter. "Some cases of extinction." in ME Soule and BA Wilcox, ed., Conservation biology. (Sunderland, MA: Sinauer, 1980) pp. 119-134.

Tuhy, Joel and MacMahon, James. Vegetation and Relict Communities of Glen Canyon National Recreation Area (Logan, UT: Utah State University, final report for contract CX1200-6-B076, 1988).

Turner, MG, WH Romme, RH Gardner, RV O'Neill, TK Kratz. "A revised concept of landscape equilibrium: disturbance and stability on scaled landscapes." Landscape Ecology. vol. 8, (1993) pp. 213-227.

Utah Natural Heritage Program. Vascular Plant Database. (Salt Lake City, UT: Unpublished, Utah Division of Wildlife Resources).

Van Devender, AR and WG Spaulding. "Development of vegetation and climate in the Southwestern United States." Science. vol. 204, (1979) pp.701-710.

Van Dyke, FG, RH Brocke, HG Shaw, BB Ackerman, TP Hemker, and FG Lindzey. "Reactions of mountain lions to logging and human activity." Journal of Wildlife Management. vol. 50, (1986) pp. 95-102.

Van Pelt, Nicholas and Tuhy, Joel, "Relict Vegetation Sites: Urgent Inventory Need for Desert Parks." Park Science, vol. 11, no. 3 (Summer 1991) p. 20.

Van Riper, C III. Proceedings of the Second Biennial Conference on Research in Colorado Plateau National Parks. (NPS/NRNAU/NRTP-95/11. USDI-NPS.1995).

Wagner, FH. "Population dynamics." in Goodall, D.W. and RA Perry, eds, Aridland ecosystems, (Cambridge, MA: International Biome Programme Publications #17, Cambridge University Press, 1981).

Warren, M. L., and B. M. Burr. "Status of freshwater fishes of the United States: overview of an imperiled fauna." Fisheries. vol. 19, (1994) pp. 6-18.

Webb, RH and HG Wilshire. Environmental effects of off-road vehicles: impacts and management in arid regions. (New York, NY: Springer-Verlag, 1981).

Wegner, J. F., and G. Merriam. "Movements of birds and small mammals between a wood and adjoining

59, (1985) pp.122-125.

Young, JA, RA Evans and BL Kay. "Cheatgrass." Rangelands. vol. 9, (1987) pp. 266-270.

Zanaboni, A. and Lorenzoni, G., "The Importance of Hedges and Relict Vegetation in Agroecosystems and Environment Reconstruction." Agriculture Ecosystems & Environment. vol. 27, nos. 1-4 (special issue) (November, 1989).

**VI. General resources (These sources describe resources that cover several disciplines within the area.)**

Abbey, Ed, "Escalante Canyon." in Meyer, Alfred, ed. Encountering the Environment (New York: Van Nostrand Reinhold, 1971).

Barnes, F.A. Utah Canyon Country. (Salt Lake City, UT: Utah Geographic Series, Inc. 1986).

Crampton, C. Gregory. Standing Up Country: The Canyonlands of Utah and Arizona (New York: A.A. Knopf, 1964; Layton, UT: Peregrine Smith, 1983).

Daughters of Utah Pioneers. Utah Rivers, Part 2 (Salt Lake City: The Daughters of Utah Pioneers, 1986)

Frankel, Zachary, A Citizen's Proposal to Protect the Wild Rivers of Utah, Southern Utah Wilderness Alliance, Salt Lake City, Utah. 1994

Kelsey, Michael. Hiking and Exploring the Paria River, Including the Story of John D. Lee and the Mountain Meadows Massacre (Provo, UT: Kelsey Publishers, 1991).

Lambrechtse, Rudi. Hiking the Escalante (Salt Lake City: Wasatch Publishers, 1985).

Millar, Rodney and Degiorgio, Joan. The Colorado Plateau: A Proposed Thematic World Heritage List Nomination. Unpublished, submitted to the Federal Interagency Panel for World Heritage, National Park Service by the State of Utah, June, 1986.

Phillips, John. "Nowhere Man", Car and Driver. Vol. 42, No. 1.( July 1996) pp. 109-121.

Powell, John Wesley. Report on the Lands of the Arid Region of the United States (Boston: The Harvard



U.S. Department of the Interior, Bureau of Land Management and Office of Surface Mining Reclamation and Enforcement. Preliminary Draft Environmental Impact Statement: Proposed Development and Operation of the Warm Springs Project. 1995.

Wahlquist, Wayne, ed. Atlas of Utah. (Provo, UT: Brigham Young University Press; Weber State College. 1981).

Wels, S.L., Rigby, J.K., Hamblin, W.K., A Survey of Natural Landmark Areas of the North Portion of the Colorado Plateau: Biotic and Geologic Themes. Brigham Young University, Provo. 1980.